GENERAL LIBRARY
SEP 71918
UNIV. OF MICH.

NOTICE TO READER.
When you finish reading this magazine place a 1-cent stamp on this notice, mail the magazine, and it will be placed in the hands of our soldiers or sailors destined to proceed over-seas.
NO WRAPPER—NO ADDRESS.
A. S. BURLESON,
Postmaster General.

TELEPHONE ENGINEER

Entered as second-class matter at the post office at Chicago, Ill., under the Act of March 3, 1879.

Volume XX *SEPTEMBER, 1918* *Number 3*

Published Monthly, at 53 West Jackson Boulevard, Chicago, Illinois, $2.00 per year.

From Its Inception
1891

During the twenty-seven years spanned by the history of the Automatic Telephone it has maintained a consistent superiority over all other contemporary equipments.

Unfinished as it was in 1891, it held the same lead in the telephone field as it then existed that its present perfected form holds today when compared with all other methods of operation.

The service advantages of the Automatic, its economy and its efficiency, were never before so apparent; the benefits it brings to operating organizations and users alike make its adoption simply a question of time.

Automatic Electric Company
CHICAGO

To Its Perfection
1918

OSHKOSH Construction Tools

Standard Everywhere

WHEREVER construction tools are used the word "Oshkosh" is a symbol of quality, of superiority.

Workmen know it as the mark of the tools they **like** to **use.**

Contractors, telephone, telegraph and electric lighting companies know it as the mark of tools that exactly fit their needs—years of faithful service at minimum cost. And there is an Oshkosh Tool for **every** need.

Your jobber carries Oshkosh Tools.

- Cant Hooks
- Carry Hooks
- Climbers
- Peavies
- Pike Poles
- Digging Bars
- Reels
- Tamping Bars
- Spoons
- Shovels

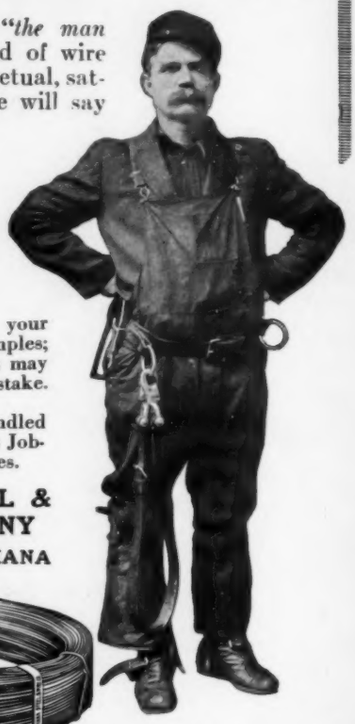
OSHKOSH MFG. CO.
308 Telner St.
OSHKOSH, WIS.

Telephone Wire

Ask your Lineman, "*the man who knows,*" the kind of wire best adapted for perpetual, satisfactory service. He will say

Muncie Wire

if he has ever seen, tried and tested it.



Before purchasing your next supply get our samples; test and compare, we may save you a costly mistake.

Muncie Wire is handled by most representative Jobbers and Supply Houses.

INDIANA STEEL & WIRE COMPANY
MUNCIE, · INDIANA

Ask the man who knows

Telephone Wire

SATISFACTORY SERVICE DEPENDS
LARGELY UPON
SATISFACTORY WIRING

SIMPLEX TELEPHONE WIRE IS APPROVED
BY TELEPHONE ENGINEERS

Samples free

SIMPLEX WIRE & CABLE Co
MANUFACTURERS
201 DEVONSHIRE ST. BOSTON
CHICAGO SAN FRANCISCO

WITH every human unit of the telephone plant operating under a war overload, it is more than ever an economy to use insulated wire of such quality as will help to secure maximum result for every labor-hour of both the plant maintenance and operating staff.

ECCO Dependable Telephone WIRE

THE ELECTRIC CABLE CO.
10 East 43rd Street : : NEW YORK CITY

F. W. SCHWAMB, Manager

PAUL H. WOODRUFF, Editor
nadnock Building, CHICAGO

This publication is free and independent of all business or house connections or control. No manufacturer or supply dealer, or their stockholders or representatives, have any financial interest in Telephone Engineer or any voice in its management or policy.

Entered at Chicago Post Office as Second Class Mail Matter under Act of March 3, 1879.

Telephone Engineer

WITH WHICH IS CONSOLIDATED
The Western Telephone Journal
ESTABLISHED 1902
PUBLISHED MONTHLY
Address all Communications to "Telephone Engineer"
MONADNOCK BUILDING, CHICAGO, ILL.
Telephone: Harrison 3014—All Departments

NOTICE TO ADVERTISERS

Changes of advertising copy should reach the office of publication not less than ten days in advance of date of issue. Regular date of issue, first day of each month. New advertisements will be accepted up to within five days of date of issue, but proof of such advertisements cannot be shown in advance of publication.

SUBSCRIPTION PRICE
Per Year $2.00
Canada $2.50
Foreign 3.00
Single copy 20
FOR SALE AT ALL NEWS STANDS

NOTICE TO SUBSCRIBERS

REMITTANCES—Remittances should be made by check, New York draft or money order, in favor of TELEPHONE ENGINEER. Foreign subscriptions may be remitted direct by International Postal Money Order.

CHANGE OF ADDRESS—The old address should be given as well as the new, and notice should be received two weeks in advance of the desired change.

If Your News Dealer Will Not Supply You—Please Notify Us

VOL. XX CHICAGO, SEPTEMBER, 1918 No. 3

Preparing for the Return

IT is just as necessary for telephone men to prepare for conditions after the war as for men in any other industry. So far as present evidence goes, there is no practical reason for questioning the return of telephone properties to private ownership. Any event to the contrary may be trusted to cast a definite shadow before; and there now is no such shadow.

The great problem of telephone operators for years has been rates. The problem is not solved, but suddenly removed. Since August 1, telephone operators have had no direct rate problem. So far as their present operation is concerned, their rates today do not matter to them.

It matters a great deal what rates have been for the last three years, if the three-year basis for compensation is applied by the government in the telephone case. If earnings for that period have been too low, there is danger of compensation being too low. That is the condition the Independent association's committee and its board of directors tried to guard against. Generally speaking, and in informal language, the just desire of the operators is for compensation based not on actual earnings for three years, but on what earnings equitably should have been for those three years.

Rate increases never can be retroactive. It is impossible to extract more revenue from the service of a period that is past. Therefore it is extremely important that fair compensation be adjusted on a basis of theoretical earnings. If the government acquisition had come during the early days of free service, this argument would have had striking demonstration.

Present rates (rates, that is, since August 1) do not affect the telephone operator's current revenue. When the "rental" to be paid by the government has once been adjusted, that becomes the operator's revenue—regardless whether the government profits or loses in the transaction. The government could give free service, or double present rates, without changing the telephone man's income for the duration of the period of possession.

But if telephone rates are raised by the government, as were railroad rates, the new schedules become part of the telephone system's process of business. There is nothing now to indicate that such increases, instigated by the government, would be forced back to their former level on return to private control. Presumably possession of such new and higher schedules would make "nine points of the law," if not ten, and the private operator would continue to collect the rates imposed by the great public operator who had been his renter.

On this wholly reasonable assumption, present and future telephone rates to be established by the Post Office Department are of vital interest to every telephone man. On the adequacy of rates now set depends the ability of the employer to pay and the employe to earn a fair wage; of capital to receive assurance of a just return commensurate with its parallel earnings in other investments; of the operating company to maintain unembarrassed an efficient and modern service.

The operator, under the present arrangement, becomes the expert employe of the non-expert, non-resident renter of his property. As an employe, as an expert and as the lessor of property which he still owns, the operator will give the best of his experience and skill toward the continued efficient conduct of the property. He will strive so to maintain it that

the temporary ends of the lessee will be perfectly served, and the permanent soundness of the investment will be established.

The return to private ownership should herald a new era of optimism and satisfaction in telephone service.

* * *

The Smaller Companies

THE statement of Postmaster General Burleson, accompanying the President's proclamation of July 23 taking over the telephone and telegraph lines of the country, contained this clause:

"The operation or control of what are commonly called farmers' telephone lines will be interfered with only for the purpose of facilitating their connections with the longer lines."

No further observations on the subject of small company holdings have emanated from official headquarters, and we may assume that farmer line companies, at least, may virtually disregard the government acquisition of telephone properties.

The farmer line company is not so definite a thing as its name might indicate. Fundamentally the term means a single line of wire along a highway, to which are connected a number of the farmhouses in the neighborhood, so that two or more of them may communicate. Such a line may grow to include a number of similar lines branching from a common center, at which is located a small switchboard for interconnecting the lines. The system thus becomes a full-fledged community exchange service. It may be operated for mutual benefit or for private profit. It may serve only its own local group, or it may connect with other similar exchanges, or with the country-wide network of long distance lines. The definition is difficult only because of uncertainty where to draw the line between a farmers' line and a city exchange.

It is reasonable to suppose that any system whose essential purpose was to serve its local community, and whose connection with long distance lines (arranged by order of the Post Office Department) was only incidental, would come under the classification with which the Postmaster General has said his department would not interfere.

These distinctly local companies, then, apparently may continue to arrange their own rates, as in most states they have done without the interference of state commissioners. They may make extensions when materials are obtainable. They may buy out their competitors or sell out to them. In short, they may continue to do business as strictly private enterprises, as they always have done.

No one anticipated any interference with the small local services, and nothing has yet happened to change that view. It is likely that the small operator who is reasonable and square may continue to run his business pretty much as he thinks best.

* * *

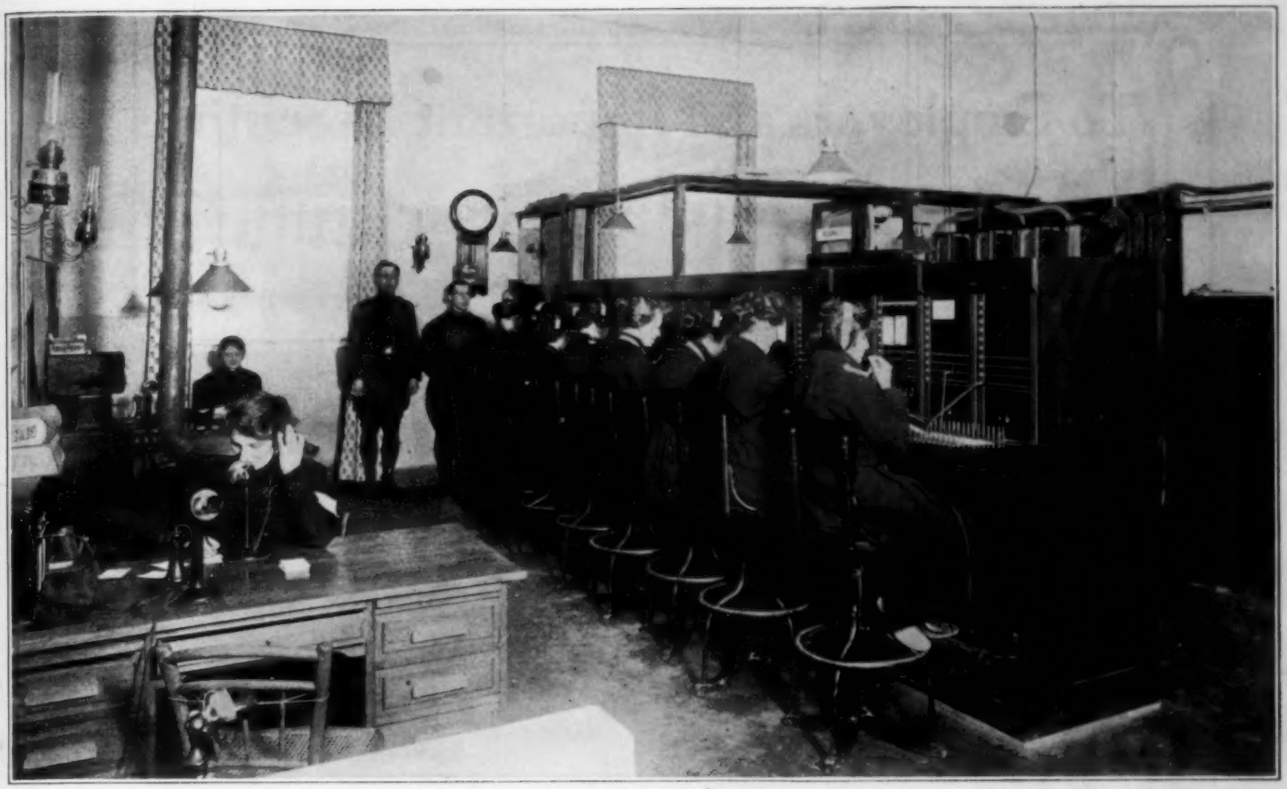
Government Buying

IT has been government practice to buy supplies either from the lowest bidder or from all responsible manufacturers on the "cost plus" plan. The latter plan, or some modification of it, seems to be the one likely to continue in favor.

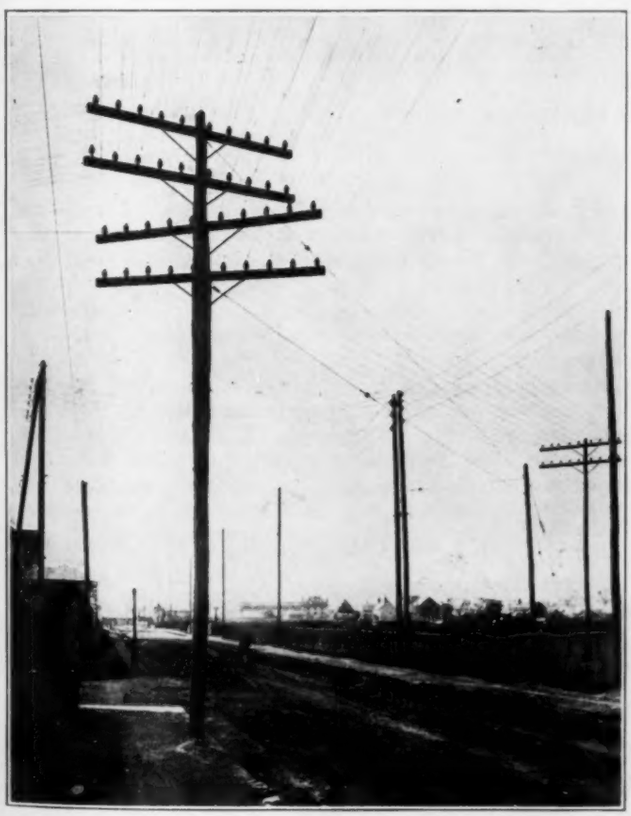
Application of this method to the buying of telephone supplies opens an interesting field (just now, before any buying has actually been done) of speculation and conjecture.

The Post Office naturally is not recognizing any boundary lines between Bell and Independent, and presumably will not do so in whatever purchasing it may undertake. If the department finds it necessary to buy supplies directly for any branch of the wire service, it will probably do so without regard for prior relations.

In most cases it is likely that the operating companies will continue to buy supplies on their own responsibility, as the railroads are doing. There may, however, arise an occasion in the telephone field similar to that which prompted the Railroad Administration to purchase a hundred thousand freight cars, with another hundred thousand in prospect. In that case the motives governing the Post Office's selection of equipment might be expected to parallel the railroad case.



American Telephone Operators Near the French Front. The Officer at the Rear Is Captain W. S. Vivian, Secretary of the United States Independent Telephone Association.



A Familiar American Junction Pole Supplementing the French Construction.

Typical Construction That Makes France Look Like America.

STORIES IN PICTURES OF THE WORK BEHIND THE LINES ACCOMPLISHED BY THE UNITED STATES SIGNAL CORPS.

To Employers and Important Executives—

A Government Proclamation

The Army Needs Your Influence in an Emergency—

This is a man-to-man appeal for you to help the Government grasp a great opportunity, and for you to discharge a grave responsibility.

The Allied program to speed up the war and quickly bring about the final overthrow of the Garman Armies calls for an immediate mustering of America's final contribution of man-power. We must raise our army to 5,000,000 men at once!

Nearly 3,000,000 of the needed 5,000,000 are already under arms—but Class 1 of the Draft will be exhausted by October 1. To go into the deferred classifications and take men essential to industries, and men with dependent families, is unwise.

A new Class 1 must be created at once. Laws are being framed calling upon men within certain ages to register (the War Department's recommendation is for 18 to 21 and 32 to 45 years as the age limits), and the President will appoint a Registration Day early in September.

Thirteen million men must register in a single day. Later these men will be classified. Industries will not lose men who are absolutely essential to them, and families will not lose their bread-winners. But every man must register.

You are a center of influence

As an employer or an important executive you are a center of influence, and the Government needs your active co-operation in putting through this gigantic task without confusion or delay. Thirteen million men must be *told* of the law between now and Registration Day (watch newspapers for date); and they must understand the *why* of it, and just *where* and *how* they are to register. For these details ask your Local Board, or your city or county clerk.

You can reach the men in your employ more effectively than they can be reached from the outside. We earnestly urge, therefore, that you make definite plans, in the interest of a speedy VICTORY, and in the interest of your own business, to see that all of your men are properly informed, so that they can be promptly and correctly registered when the day comes.

Every man between the ages to be specified in the President's Proclamation must register.

How you can help

Start at once to get in touch with your men. Bring to their attention the *need* for the registration and the *facts about it.* Get in touch with your Local Registration officials and co-operate with them.

Here are a few suggestions:

Arrange for talks to your men; place inspirational and informative bulletins on bulletin-boards; establish Selective Service Information Bureaus; inclose slips in your men's pay envelopes.

Arrange for definite hours when the men in the different departments or sub-divisions of your business shall be allowed time to go and register. Post full lists of the men in your employ between the specified ages, the men to check off their names after they have registered.

Many other ideas, applicable to your own business, will doubtless occur to you.

This is an emergency such as this country has never faced before, and the Government must depend upon you to bring all of your influence and inspiration and ingenuity to bear out this problem, that this crisis in the war may be met in a way that shall avoid hardship to the businesses and families of the Nation.

Signed:

E. H. CROWDER
PROVOST MARSHAL GENERAL

Approved:

NEWTON D. BAKER
SECRETARY OF WAR

Watch the newspapers for the date and further details

Contributed through Division of Advertising — *United States Govt. Comm. on Public Information*

This space contributed for the Winning of the War by the Publisher of

TELEPHONE ENGINEER

Compensation for Government Control

Independent Operators Hold Meetings at Washington and Chicago and Determine Claims

BY F. B. MACKINNON

BELOW is the statement given to the press at midnight, July 31 by Postmaster General Burleson, immediately after he had formally taken possession and control in behalf of the United States Government of the telephone and telegraph systems of the country.

The statement is in effect an order to the telephone officers and employees to continue to operate as heretofore the properties in which they are employed. It will be noted that in addition to the instructions to officers and employees in charge of operation, instructions are also given officials having in charge financial matters to continue to pay dividends and interest and *to renew maturing obligations* until the Postmaster General orders differently.

F. B. MacKinnon, Vice President, U. S. Independent Telephone Association.

The president of the United States Independent Telephone Association, G. W. Robinson, the Association's attorney, F. C. Stevens, and Vice President F. B. MacKinnon, conferred with Postmaster General Burleson and his three assistants, Messrs. Koons, Lewis and Lamar, on Tuesday, July 30. The Independent interests were discussed in a general way. No definite statement as to plans of the Administration in the operation of the telephone systems were made by the Postmaster General. A careful investigation of the problems of the industry is being made and in due time orders and instructions and announcement of plans will be made.

The owners of telephone properties are now confronted with the problem of compensation to be paid them for the use of their properties by the Government. The officers responsible to the owners for the safeguarding of their investment should see to it that careful memoranda are made of all property turned over to the Government, or which the Government may claim the right to possess: including cash on hand, bills and accounts receivable, and employees working funds. In our opinion, a new set of books should be opened by every company, which will be the Government's books. A special inventory should be made of material and supplies on hand. Definite orders as to what property the Government will claim will probably be issued, but immediate inventories are necessary to supply a basis for compensation later.

A conference of representatives of Class A Independent companies was called by the Association, to be

Announcement by Postmaster General Burleson at Midnight, July 31, 1918

Pursuant to the proclamation of the President of the United States I have assumed possession, control and supervision of the telegraph and telephone systems of the United States. This proclamation has already been published and the officers, operators and employees of the various telegraph and telephone companies are acquainted with its terms.

Until further notice the telegraph and telephone companies will continue operation in the ordinary course of business through regular channels. Regular dividends heretofore declared and maturing interest on bonds, debentures, and other obligations may be paid in due course and the companies may renew or extend their maturing obligations unless otherwise ordered by the Postmaster General. All officers, operators, and employees of the telegraph and telephone companies will continue in the performance of their present duties, reporting to the same officers as heretofore and on the same terms of employment. Should any officer, operator or employee desire to leave the service he should give notice as heretofore to the proper officer so that there may be no interruption or impairment of the service to the public.

I earnestly request the loyal cooperation of all officers, operators and employees, and the public, in order that the service rendered shall be not only maintained at a high standard but improved wherever possible. It is the purpose to coordinate and unify these services so that they may be operated as a national system with due regard to the interests of the public and the owners of the properties.

No change will be made until after the most careful consideration of all the facts. When deemed desirable to make changes announcement will be made.

held in Washington, August 5. At this conference the question of compensation and the procedure to be adopted by companies in preparing to sustain their contentions as to plant values was discussed at length. As a result of this conference the Association is able to recommend a definite procedure to be followed by its members in handling the difficult problems with which the owners of our properties are now confronted.

The Washington Meeting

Pursuant to the call of President G. W. Robinson, the representatives of the twenty-two Class A Independent telephone companies, in which class are twenty-five companies, met in Washington, D. C., and discussed the question of a proper basis of compensation to be used by the Government in paying the Independent telephone companies for the use of their properties, while those properties are under Government control.

George W. Robinson.

Nathan C. Kingsbury.

The conference formulated a statement which was presented to the Board of Directors of the Association

The Post Office Department authorized th e following August 7, 1918.

Consolidation of Telephone Properties

Postmaster General Burleson states that the governmental operation and control of the telephone systems of the country would undoubtedly cause the coordination and consolidation of competing systems wherever possible. Investigation by the committee in charge of the telegraph and telephone service shows that negotiations were already under way for the consolidation of a number of competing telephone systems at the time the Government assumed control. The Postmaster General will not disturb these negotiations in any manner. When an agreement is reached between telephone companies in the matter of consolidation it should be submitted to the Post Office Department for approval. Where no negotiations with a view of consolidation have yet begun, the Postmaster General stated there is no objection to the companies taking up such negotiations with the understanding that any agreement reached would have to be finally approved by him before it could actually be consummated.

Committee Appointed

The Postmaster General is speeding up in every way possible the collection of information for the guidance of the telegraph and telephone committee in the prosecution of their work relative to the control and operation of the wire systems.

A committee composed of A. M. Dockery, Third Assistant Postmaster General; Charles E. Matthews, superintendent Division of Money Orders; William C. Fitch, superintendent of Division of Stamps; William E. Buffington, superintendent Division of Finance; and Charles H. Fullaway, assistant Director Division of Postal Savings, was appointed today.

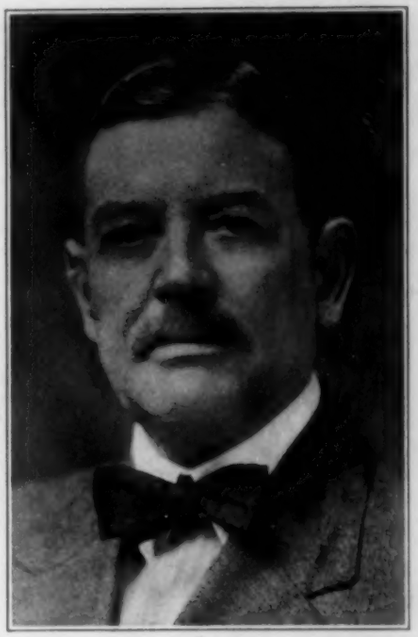
1. To determine the use of the telegraph in transmitting money through means of money orders;
2. To determine the use of the stamp in connection with telegraph service;
3. To determine the effect the use of stamps will have on accounting systems now in use by telegraph companies;
4. To make a careful study of the auditing systems now in use and what changes should be made to effect consolidations with postal system; and
5. To determine whether the same system of handling telegraph funds can be adopted as is now in use in the Postal Service.

Branch Telegraph Offices

Carter B. Keene, director Division of Postal Savings; Goodwin D. Ellsworth, superintendent Division of Post Office Service; M. O. Chance, postmaster, Washington, D. C.; Henry F. Taff, general superintendent Western Union Telegraph Co., Washington, D. C.; and George M. Foot, manager Postal Telegraph Co., Washington, D. C., are appointed a committee to investigate and determine the extent to which branch telegraph offices should be consolidated or coordinated with branch postal stations; also the extent to which messenger service of the telegraph companies may be coordinated with that of the special-delivery service of the Postal Service.

J. C. Koons.

David J. Lewis.



William H. Lamar.

at a meeting of that board, held in Chicago at the Hotel LaSalle, at 10 a. m. Friday, August 16.

In view of the vital importance of the question, it was decided to invite to Chicago, at the time of the directors' meeting, representatives of all Independent companies, whether those companies were members of this Association or not. The Board of Directors held a public conference wherein this question of compensation by the Government was discussed.

A meeting of the presidents and secretaries of the state associations was also held during the conference, so that the Association officials might secure information which they in turn could transmit to their members. It was the desire of the directors of this Association that all Independent companies should have opportunity to express their opinions as to compensation.

President Robinson was chairman of the Washington meeting and F. B. MacKinnon, secretary. In attendance were F. H. Woods, Lincoln, Neb.; A. F. Adams, Kansas City, Mo.; William Fortune, Indianapolis, Ind.; P. S. Pogue, Louisville, Ky.; W. J. Melchers and C. T. Babcock, Owosso, Mich.; C. E. Tarte and R. D. Graham, Grand Rapids, Mich.; H. L. Reber and Attorney Bruce Campbell, St. Louis, Mo.; W. G. Brorein and Treasurer Hicks of Tampa, Fla.; James Stewart and E. M. Prisk, Hazleton, Pa.; John Z. Miller, Erie, Pa.; George R. Fuller, Rochester, N. Y.; C. Y. McVey, Columbus, Ohio; F. L. Beam, Mt. Vernon, Ohio; F. R. Huntington, C. A. Carl and Attorney Weller, Harrisburg, Pa.; F. E. Bohn, Fort Wayne, Ind.; W. H. Prince, Philadelphia; E. D. Schade of Johnstown, Pa.; F. C. Stevens of St. Paul, Minn., attorney for the Association; Hart Farwell, Terre Haute, Ind.; W. S. Paca, Oil City, Pa.; John H. Wright, Jamestown, N. Y.; K. B. Schotte, Kittanning, Pa.; R. L. Stewart, Thomasville, Ga.; Thomas Bromley, Muskegon, Mich.; W. W. Johnson, Jefferson City, Mo.; C. O. Trask and T. W. Twyman, Charlottesville, Va.

Committees Appointed by Postmaster General

Nathan C. Kingsbury, Vice President, American Telephone and Telegraph Company, and George W. Robinson, President, Tri-State Telephone and Telegraph Company, are designated by me for the purpose of making the necessary investigations, conducting negotiations and arriving at agreements for the unification and consolidation of the various telephone companies operating in the same communities within the United States. Any agreements resulting from these negotiations will be submitted to the Postmaster General for final approval.

James I. Blakslee, Fourth Assistant Postmaster General, James A. Edgerton, Purchasing Agent, and Ruskin McArdle, Chief Clerk, Post Office Department, are appointed a committee to study the question of the purchase of supplies for the telegraph and telephone systems and how the cost of such supplies compares with the list of the General Supply Committee, also with the schedules for the postal service.

Otto Preager, Second Assistant Postmaster General, George M. Sutton, Chief Post Office Inspector, and Marvin M. McLean, Superintendent, Division of Dead Letters, are appointed a committee to investigate and determine whether it would be practicable to divide the country into telephone and telegraph districts agreeing with the number and territory of the railway mail service and inspectors' divisions.

A. S. BURLESON.

Postmaster General's Order of August 15th, 1918

Pursuant to the authority vested in me by the President of the United States in his proclamation of July 22, 1918, you are notified that during the period of Federal control, and unless and until otherwise advised by me, all telephone companies operating in the United States are directed:

1. To confine extensions and betterments to imperative and unavoidable work to meet war requirements and the vital commercial needs of the country. All companies should at once adopt and enforce such rules and regulations as may be necessary and proper to accomplish this result because of the difficulties, incident to war conditions, of securing adequate supplies, labor and transportation.

2. To proceed as expeditiously as possible with the plans heretofore instituted for consolidating and unifying the telephone plants and properties. Plans for consolidating the plants and properties where consolidation is manifestly desired by the public, where it can be effected on fair terms and in accordance with the law, should be formulated as soon as practicable and submitted to this Department.

3. Whenever two telephone systems are operating in the same area, the managements concerned should cooperate in making extensions and betterments, in order that unification and the elimination of waste in money, man-power and materials may be brought about as expeditiously as possible, in an orderly way, and with due regard to the rights of the owners of the properties and the convenience of the public.

4. This order is not intended to direct any action, course or policy which in the judgment of the owners of any property involved will result in damage or injury to their business or property. In any case of contemplated action hereunder, where in the judgment of the owners damage or injury will result, the Company in interest, before acting, will bring the matter to the attention of the Department, and await further instructions.

A. S. BURLESON.

BASIS OF COMPENSATION

The committee appointed to draft a resolution embodying the ideas of the conference consisted of Messrs. Robinson, MacKinnon, McVey, Adams, Reber, Tarte, Brorein, Fortune and Schade.

July 30 the special war committee of the National Association of Railway and Utility Commissioners met with Postmaster General Burleson and tendered the co-operation of the state commissioners. Following the conference with the postmaster general, a letter was sent to him by President Charles E. Elmquist and Joseph B. Eastman, chairman of the special war committee:

Confirming our conversation with you this afternoon, the special war committee of the National Association of Railway and Utilities Commissioners, in behalf of that association, desires to offer you its co-operation in your new task of directing the affairs of the telephone and telegraph properties of the country. We wish federal administration to be an unqualified success in the public interest, and if we can help in achieving that result, we want you to feel that you can call upon us at any moment. In making this statement we are assured that we are merely recording the sentiments of every state public service commission in the country.

In all but four of the states these commissions have supervision over telephone and telegraph rates and service, and they have built up special departments for the handling of this work. Outside of the companies themselves, we think it safe to say that the state commissioners have more extensive and more expert knowledge of these properties and of the public problems involved in their administration than any group of men in the country. This knowledge is at your command so far as you may desire to avail yourself of it.

We realize that you have not as yet had time or opportunity to determine upon definite plans for the carrying on of your new work. For the present, therefore, beyond our general offer of co-operation, we have only one or two suggestions to make. In many states there are a very large number and variety of telephone companies, conducting in many instances a strictly local business. Confusion is likely to arise as to the status of these and other companies under the new dispensation.

SUGGESTIONS TO AVOID CONFUSION

Until you have time to canvass the situation thoroughly, which will in itself prove no easy task, we suggest that confusion can be avoided and public rights preserved by announcing that it is your desire that the companies should continue to observe local police regulations and respond to the supervision of the state commissioners in the same manner as heretofore. Failure to do this, we fear, may lead to misunderstanding, on the part of both the companies and the general public, and interfere with the proper functioning of the system of public control which has been established all over the country for the protection of the public interest. Such an announcement would, as we understand the situation, be in entire accord with the spirit and intent of the resolution of Congress dated July 16, 1918, and of the proclamation of the President issued thereunder.

Under the existing system of public control, it is a very general provision of the statutes that all rates must be filed with the commissions and that no changes may be made without due notice to the public, subject to the power of suspension by the commissions pending investigation. If, after your study of the situation, you should be inclined to the view that the national interest in the present emergency demands some change in this established mode of regulation, the only other suggestion that we now have to offer is that you should consult with representatives of the state commissions before reaching any definite conclusion. In view of our knowledge of local conditions and of our past experience we feel that we may be in a position to help you to avoid possible errors into which you might otherwise unwittingly be led.

The Class A Independent telephone companies, at the Washington meeting, adopted the following statement with the recommendation that the Board of Directors of the United States Independent Telephone Association give the statement consideration at an early date:

It is the desire of the Independent telephone companies to co-operate in all plans of control adopted by the Federal Government.

It is believed that the general plan of compensation to the railroads on a basis of pre-war earnings for a three-year period cannot be generally applied justly and equitably to the Independent telephone industry.

"Just Compensation" as set forth in the law authorizing the taking possession and control of telephone properties by the Government includes provision for suitable upkeep of the properties, a fair return on the rental value of the property and business during the period of Government control, and full compensation for any impairment of the property and business when returned to the owner. Such a definition of the term "just compensation" would seem to cover the following situations and conditions:

1. Such cash on hand and bills and accounts receivable, equivalent to cash, as taken by the Government are in the nature of a loan of such sums to the Government on the first day of August, 1918.
2. All supplies and material taken by the Government should not be regarded as rental property but as property purchased

and its fair value on August 1, 1918, should be paid by the Government to the company as of that date.

3. The operating properties of the systems taken over should be considered under the following classification, and an allowance in compensation made for the rental values shown to exist in the various properties of those classes on the first day of August, 1918.

(a). Where recent expenditures for additions, improvements and equipment are not fully reflected in the operating income of the three-year period or a substantial portion thereof.

(b). Where competitive conditions have been eliminated by consolidations, exchange of property or other readjustments.

(c). Where some companies have been subject to undeveloped or abnormal conditions such as unusual storms and weather conditions, or conditions created by military or other Government activities which cannot be reflected in a continuous or increasing volume of profitable business.

(d). Where rate increases have recently been granted or become effective.

(e). Where prior to August 1, 1918, applications for rate increases have been made and subsequently such increases or any part thereof have been allowed and shall become effective.

(f). Where properties have recently been placed in operation or have been under a receivership or reorganization and there has not been time or opportunity to develop the earnings from the property, the fair rental value as of August 1, 1918, should be based on appraisal.

4. A considerable number of the Independent telephone companies operate under conditions such that the general rule of compensation provided in the railroad act of March 21, 1918, could to them be fairly applied in so far as it provides that there be paid a rental equivalent to the average annual operating inome for a three-year period, which three-year period as applied to telephone companies should end December 31, 1917.

5. The rental due all telephone companies shall be paid in quarterly installments in cash from which there shall be no deductions.

6. The present standard of maintenance and earning capacity of the property shall be maintained throughout the rental period and the property and business shall be returned to the lessor without impairment. In case of impairment or depreciation in value of such property and business during Government control the owner should receive just and fair compensation for such impairment or depreciation.

The Chicago Meeting

The opinion of the Board of Directors of the Association, relative to a basis of compensation to be used by the Government in paying the owners of the telephone properties for the use of those properties while they are under Government control, is an amended form of the statement prepared at the Washington meeting.

This opinion was formally expressed by the Board of Directors at a meeting of the board held in Chicago, August 17. Telephone men are requested to give it earnest consideration before expressing an opinion as to the compensation that will be satisfactory to them for the use of their property.

A questionnaire has been sent out by Postmaster General Burleson to Class A, B and C telephone companies, which calls for information as to the revenues and expenses of those companies from July 1, 1914, to June 30, 1918, and an estimate for the year ending June 30, 1918, and an estimate for the past year, ending June 30, 1919. The question is also asked: "What basis, in your opinion, should be used in determining just compensation for your company?" Information is also asked as to investment in fixed capital, capital stock and funded debt outstanding July 1, 1918. Any Class A, B or C company not receiving a copy of this questionnaire should notify the office of the Association to that effect at once.

The Postmaster General asks that acknowledgement of receipt of the questionnaire be made on card enclosed for that purpose. We would suggest that all be sure to comply with this request promptly.

Members are requested to file their answers through the Association's Washington office. By so doing they will enable the Association to be of assistance to them and to the Government, as it can check the answers carefully and make sure that all questions are understood and answered fully.

The directors' statement follows:

It is the desire of the Independent telephone companies to cooperate in all plans of control adopted by the Federal Government.

It is believed that the general plan of compensation to the railroads on a basis of prewar earnings for a three year period cannot be generally applied justly and equitably to the Independent telephone industry.

"Just Compensation" as set forth in the law authorizing the taking possession and control of telephone properties by the Government includes provision for suitable upkeep of the properties, a fair return on the rental-value of the property and business during the period of Government control, and full compensation for any impairment of the property and business when returned to the owner. Such a definition of the term "Just Compensation" would seem to cover the following situations and conditions:

1. Such cash on hand and bills and accounts receivable, equivalent to cash, as taken by the Government are in the nature of a loan of such sums to the Government on the first day of August, 1918.

2. All supplies and material taken by the Government should not be regarded as rental property but as property purchased and its fair value on August 1, 1918, should be paid by the Government to the company as of that date.

3. The operating properties of the systems taken over should be considered under the following classification, and an allowance in compensation made for the rental-values shown to exist in the various properties of those classes on the first day of August, 1918:

(a) Where expenditures for additions, improvements and equipment are not fully reflected in the operating income of the three year period or a substantial portion thereof.

(b) Where competitive conditions have been eliminated by consolidations, exchange of property or other readjustments.

(c) Where some companies have been subject to undeveloped or abnormal conditions such as unusual storms and weather conditions; or conditions created by military or other Government activities which cannot be reflected in a continuous or increasing volume of profitable business; or all other exceptional conditions not herein expressed.

(d) Where rate increases have recently been granted or become effective.

(e) Where prior to August 1, 1918, application for rate increases have been made and subsequently thereto such increases or any part thereof have been or may be allowed and shall become effective.

(f) Where properties have recently been placed in operation or have been under a receivership or reorganization and there has not been time or opportunity to develop the earnings from the property, the fair rental-value as of August 1, 1918, should be based on appraisal.

Orders on New Rates and Installation Charges

Under orders issued at Washington August 29 all changes in telephone rates must be submitted to Postmaster General Burleson for approval before becoming effective. It is also ordered that all companies make a charge for installing new telephones or changing the location of old ones.

4. A considerable number of the Independent telephone companies operate under conditions such that the general rule of compensation provided in the railroad act of March 21, 1918, could to them be fairly applied in so far as it provides that there be paid a rental equivalent to the average annual operating income for a three year period, which three year period as applied to telephone companies should end December 31, 1917.

5. The rental due all telephone companies shall be paid in quarterly installments in cash from which there shall be no deductions.

6. The present standard of maintenance and earning capacity of the property shall be maintained throughout the period of Governmental control and the property and business shall be returned to the owner without impairment. In case of impairment or depreciation in value of such property and business during Governmental control the owner should receive just and fair compensation for such impairment or depreciation.

7. For the purpose of measuring compensation and for comparative purposes before and after the period of Governmental control the system of accounts prescribed by the Interstate Commerce Commission for telephone companies should be adopted.

The Chicago meeting was attended by nearly two hundred telephone men. President Robinson called the first session to order at eleven o'clock Friday morning, August 16, and discussion was continuous, with a brief adjournment for lunch, until five in the afternoon. As the business of the meeting was not then completed, it was decided to continue the session into Saturday.

The question of compensation from the government for the use of the facilities it had taken over, and discussion of the more or less parallel railroad plan, occupied the entire attention of the meeting. The only variation of the subject was Harold L. Beyer's appeal, as chairman of the association's finance committee, for a more active financial support of the association during its period of greatest opportunity for service to members.

Opposition to the application of the railroad plan to the telephone centered around the multiplicity of exceptions and special cases peculiar to the telephone industry. Others contended, however, that all possible exceptions had been provided for in the tentative statement offered by the committee. Judge N. G. Hunter was one of those who strongly supported this position, while Frank F. Fowle, receiver for the Central Union, took the opposite stand.

A pleasant break in the discussion occurred Friday afternoon when Judge Hunter, in behalf of the association, presented a bouquet of American Beauty roses to President Robinson in honor of his fiftieth birthday.

To Employees of the Bell Telephone Companies

Under the authority of the law and by the proclamation of the President, possession and control of the wire systems pass to the Postmaster General as of August 1.

In a conference held in Washington, at which were present the Postmaster General, the Government Operating Committee, and representatives of the Bell Companies, the Postmaster General expressed most emphatically his appreciation of the service which the Bell Companies were rendering, and stated that such improvement possible to be made would be because of the additional power derived from the Government. He asked for the co-operation and assistance of those who had heretofore been responsible for the service.

The Postmaster General was equally emphatic in the statement of his desire to conserve the service and properties of the companies with a view of returning them when called upon so to do to the owners in as good condition as received; that it was his earnest desire that the owners should receive just compensation in the full sense for their use.

The Postmaster General, until other instructions are issued, desires that the conduct of operations shall continue as heretofore, and also states that no changes will be made until after consultation and full and careful consideration.

To all who are identified with the Bell Companies,—who have shown your fine sense of obligation and your loyalty and fidelity to the country, to the public service, and to the property in the past, and to whom the credit is due for the prestige and position of the companies in the public eye:—It is asked, and it is not too much to ask of you, that same loyalty, fidelity, and devotion to the service under the new order of things. On your behalf such loyalty, fidelity, and devotion to service have been promised, knowing full well the spirit in which you would meet and respond to the request.

To do one's full duty in each position is the greatest obligation resting upon every person and is also the greatest opening to future preferment.

July 31, 1918. **THEO. N. VAIL, President.**

Registered at Chicago August Sixteenth

Adams, A. F., Kansas City, Mo., president, The Gary System.
Anderson, C. J., Chicago, representing Marion County Electric Co., Knoxville, Iowa.
Anderson, P. P., Canton, Ill., manager, Canton Home Telephone Co. and Farmington Telephone Co.
Annan, George, Lincoln, Ill., manager, Central Illinois Telephone & Telegraph Co.
Appleman, J. S., Chicago, representing companies operating in Oskaloosa, Albin, New Sharon and Eddyville, Iowa.
Archer, C. E., Louisville, Ky., general auditor, Louisville Home Telephone Co.
Atkinson, George E., Creston, Iowa, secretary-manager, Creston Mutual Telephone Co.
Bailey, W. M., Richmond, Ind., general manager, Richmond Home Telephone Co.
Barber, E. L., Aurora, Ill., vice-president, Inter-State Independent Telephone & Telegraph Co.
Bates, E. I., Chippewa Falls, Wis., superintendent, Chippewa County Telephone Co.
Batte, B. H., St. Louis, Mo., assistant manager, Utilities Indemnity Exchange.
Bauch, E. H., Park Falls, Wis., secretary-treasurer, Glidden Telephone Co.
Beam, Frank L., Mount Vernon, Ohio, president, Ohio Independent Telephone Association; president, Mount Vernon Telephone Co.
Bellamy, Earle D., Knoxville, Iowa, manager, Marion County Electric Co.
Bellamy, Herbert, Knoxville, Iowa, secretary, Marion County Electric Co.
Benoist, W. F., Chicago, sales manager, Automatic Electric Co.
Berry, O. F., Carthage, Ill., president and general manager, Mississippi Valley Telephone Co. and Independent Telegraph & Telephone Co.
Beyer, Harold L., Grinnell, Iowa, president, Interior Telephone Co. and What Cheer Telephone Co.
Biglow, A. L., Ashland, Wis., secretary-general manager, Ashland Home Telephone Co.
Binkley, Frank, Bellefontaine, Ohio, general manager and secretary, United Telephone Co.
Bohn, Frank E., Fort Wayne, Ind., secretary and assistant general manager, Home Telephone & Telegraph Co., and president, Indiana Independent Telephone Association.
Boszar, R. M., Avilla, Ind., manager, Avilla Mutual Telephone Co.
Bott, W. L., Rensselaer, Ind., secretary-treasurer and manager, Jasper County Telephone Co.
Boyer, Jerome W., West Plains, Mo., president and manager, West Plains Telephone Co.
Brande, E., Silver Lake, Ind., manager, People's Mutual Telephone Co.
Bright, Jesse V., Flora, Ind., treasurer, Flora Telephone Co.
Bromley, Thos., Jr., Muskegon, Mich., general manager, United Home Telephone Co.
Brorein, W. G., Tampa, Fla., president and general manager, Peninsular Telephone Co., and president, Florida Telephone Association.
Browne, J. A., Winchester, Ind., general manager, Eastern Indiana Telephone Co.
Bruner, J. F., Rantoul, Ill., manager, Coon Brothers Telephone Co.
Burns, W. R., Munising, Mich., president, Munising Telephone & Electric Co.
Bush, Albert, Columbia City, Ind., president, Farmers Mutual Telephone Co.
Bryant, W. H., Mobile, Ala., vice-president and general manager, Home Telephone Co.
Caldwell, Oral, Lincoln, Ind., general manager, Deer Creek Telepohne Co.
Cannon, Geo. X., Freeport, Ill., general manager, Stephenson County Telephone Co.
Carter, A. J., Chicago, general sales manager, Kellogg Switchboard & Supply Co.
Chase, Albert B., South Haven, Mich., secretary-treasurer, Van Buren County Telephone Co.
Clouser, M. L., Thornton, Ind., manager, Thornton Telephone Co.
Coffey, J. W., Indianapolis, Ind., Coffey System & Audit Co.
Cole, Fred M., Ashland, Wis., president, Ashland Home Telephone Co.
Collins, J. W., Lincoln, Ill., vice-president, Mt. Pulaski Telephone & Electric Co.
Collins, L. B., Woodward, Okla., president, Fort Supply Telephone & Telegraph Co.
Cook, W. L., Chicago, president, Reliable Electric Co.
Cox, Jas. N., Cookeville, Tenn., general manager, Gainesboro Telephone Co.
Crawford, Howard I., Wausau, Wis., superintendent, Wausau Telephone Co.
Crowley, J. C., Jr., Superior, Wis., secretary-treasurer and manager, Peoples Telephone Co.
Cuppy, F. O., Lafayette, Ind., secretary-treasurer and general manager, Lafayette Telephone Co.
Curren, A. J., Elyria, Ohio, president and manager, Elyria Telephone Co.
Deering, Chas. C., Des Moines, Iowa, secretary, Iowa Independent Telephone Association.
Denkhoff, J. H., Dyersville, Iowa, secretary, Interstate Telephone Co., and president, Iowa Independent Telephone Association.
Dorland, R. O., LaPorte, Ind., general manager, LaPorte Telephone Co.
Duncan, J. C., Knoxville, Tenn., president, Peoples Telephone & Telegraph Co., president, Southern States Independent Telephone Association.
Edwards, J. B., Chicago, president and general manager, Kellogg Switchboard & Supply Co.
Eldridge, Frank L., Chicago, sales department, Kellogg Switchboard & Supply Co.
Farwell, Hart F., Terre Haute, Ind., president and general manager, Citizens Independent Telephone Co.
Fifer, E. C., South Haven, Mich., general manager, Van Buren County Telephone Co.
Fish, E. C., Clifton, Ill., president and treasurer, Local Telephone Co.
Fisher, E. B., Grand Rapids, Mich.
Folsom, Henry P., Circleville, Ohio, vice-president, Citizens Telephone Co.; secretary, Ohio Independent Telephone Association.
Ford, W. L., Carbondale, Ill., general superintendent, Murphysboro Telephone Co.
Fortune, Wm., Indianapolis, Ind., president, Indianapolis Telephone Co.
Fowle, Frank F., Chicago, receiver, Central Union Telephone Co.
Fuller, George R., Rochester, N. Y., president, Rochester Telephone Co.
Glandon, Ed D., Pittsfield, Ill., secretary-manager, Pike County Telephone Co. and Independent Toll Clearing Co., and president, Illinois Independent Telephone Association.
Goodrich, W. F., La Crosse, Wis., secretary-treasurer and manager, La Crosse Telephone Co.
Gordon, Dr. R. E., El Paso, Ill., president and manager, El Paso Telephone Co., and secretary, Illinois Independent Telephone Association.
Greaves, Jay, Glencoe, Minn., president, McLeod County Telephone Co.
Gregg, E. E., treasurer, Commercial Telephone & Telegraph Co., Olney, Ill.
Griffitts, L. C., Seymour, Ind., president, Seymour Telephone Co.
Hageman, A. V., Lorain, Ohio, treasurer, Black River Telephone Co.
Hageman, H. E., Lorain, Ohio, secretary, Black River Telephone Co.
Haley, J. B., Chicago, sales department, Kellogg Switchboard & Supply Co.
Hall, Geo. L., Dowagiac, Mich., receiver, Cass County Home Telephone Co.
Hall, Roy W., Westfield, Ill., owner and manager, Westfield-Kansas Telephone Co.
Hanna, Samuel J., Caledonia, Mich., vice-president, Leighton Telephone Co.
Hanway, T. E., Monticello, Ind., manager, Monticello Telephone Co.
Haubrich, A. M., Chicago manager, Stromberg-Carlson Telephone Mfg. Co.
Hawley, W. P., Bluefield, W. Va., general manager, Bluefield Telephone Co.
Haywood, Geo. P., Lafayette, Ind., president, Lafayette Telephone Co.
Head, C. B., Petersburg, Ind., general manager, Pike County Telephone Co.
Heavens, Fred J., Pittsburgh, Pa., superintendent of plant, Pittsburgh & Allegheny Telephone Co., and president, Western Pennsylvania Independent Telephone Association.
Heineman, N., Wausau, Wis., president, Wausau Telephone Co.
Heller, S. M., Louisville, Ky., general manager, Central Home Telephone & Telegraph Co.
Himebaugh, A. C., Burr Oak, Mich., president, Southern Michigan Telephone Co.
Himebaugh, R. L., Burr Oak, Mich., secretary-treasurer, Southern Michigan Telephone Co.
Holdoegel, P. C., Rockwell City, Iowa, secretary-manager, Central Mutual Telephone Co.
Holliday, W. W., Jacksonville, Ill., president and general manager, Illinois Telephone Company.
Hosea, M. F., Indianapolis, Ind., traffic manager, Indianapolis Telephone Co., and secretary-treasurer, Indiana Independent Telephone Association.
Howe, Fred, Janesville, Wis., president, Rock County Telephone Co.
Hunsberger, Titus, Caledonia, Mich., secretary, Leighton Telephone Co.
Hunter, N. G., Wabash, Ind., president, Home Telephone Co.
Hurtz, L. E., Lincoln, Neb., general manager, Lincoln Telephone & Telegraph Co., and secretary-treasurer, Nebraska Independent Telephone Association.
Inks, H. E., Ligonier, Ind., Ligonier Telephone Co.
Johnson, W. W., Jefferson City, Mo., secretary, Missouri Telephone Association.
Kast, E. C., Minneapolis, Minn., secretary and assistant treasurer, Minnesota Independent Telephone Association.
Knapp, Frank A., Bellevue, Ohio, president and general manager, Local Telephone Co. and Bellevue Home Telephone Co.
Knipe, H. H., Olney, Ill., president, Commercial Telephone & Telegraph Co.
Koontz, Charles E., Bremen, Ind., manager, Bremen Home Telephone Co.
Kraege, L. M., Topeka, Kans., secretary, Kansas Independent Telephone Association.
Lenz, J. M., Chicago, secretary-treasurer, Runzel-Lenz Electric Mfg. Co.
Lindquist, Fulda, Minn., secretary-manager, Fulda Telephone Co., and president, Minnesota Independent Telephone Association.
Lumpkin, W. C., Mattoon, Ill., general manager, Coles County Telephone & Telegraph Co.
MacKinnon, F. B., Washington, D. C., vice-president, United States Independent Telephone Association.
Maloney, Patrick J., Columbia City, Ind., manager, Whitley County Telephone Co.
Mann, N. E., Macomb, Ill., president, Mann Telephone Co.
Martz, Chas. M., Tipton, Ind., secretary-treasurer, Arcadia Telephone Co., also representing Tipton Telephone Co.
Mapes, Roy F., Grand Rapids, Mich., secretary-treasurer, Michigan Independent Telephone Association.
McCanne, W. Roy, Rochester, N. Y., treasurer and general manager, Stromberg-Carlson Telephone Mfg. Co.
McHenry, Houck, Jefferson City, Mo., general manager and secretary, Capital Telephone Co.; president, Missouri Telephone Association.
McVey, C. Y., Columbus, Ohio, president, Ohio State Telephone Co.
Melchers, W. J., Owosso, Mich., general manager, Union Telephone Co.
Milburn, J. D., Chicago, district sales manager, Page & Hill Co.
Miller, A. L., Syracuse, Ind., manager, Syracuse Home Telephone Co.
Minton, A. B., Murphysboro, Ill., president, Murphysboro Telephone Co.
Neill, D. M., Red Wing, Minn., president, Red Wing Telephone Co.
Norris, Fred A., Monmouth, Ill., manager, Monmouth Telephone Co.
Oelkers, D., Clyde, Kans., manager, Clyde Telephone Co.
Osborn, John L., Veedersburg, Ind., manager, Veedersburg Telephone Co.
Paca, Wm. S., Oil City, Pa., general manager, Petroleum Telephone Co.
Parlett, Albert, Bristol, Va.-Tenn., president, Bristol Telephone Co.
Phend, H. R., Milford, Ind., manager, Royal Telephone Co.
Plaister, J. M., Fort Dodge, Iowa, general manager, Fort Dodge Telephone Co.
Pogue, P. S., Louisville, Ky., general manager, Louisville Home Telephone Co.
Pratt, Chas. R., Flat River, Mo., general manager, Lead Belt Telephone Co.
Pratt, John A., Madison, Wis., secretary, Wisconsin State Telephone Association.
Pratt, Warren, Kearney, Neb., president, Kearney Telephone Co.
Purcell, E. A., Taylorville, Ill., general manager, Christian County Telephone Co.
Reber, H. Linton, St. Louis, Mo., president, Kinloch Telephone System.
Richardson, M. P., Janesville, Wis., vice-president, Rock County Telephone Co.
Risser, J. F., Des Plaines, Ill., manager, Des Plaines Telephone Co.
Robinson, G. W., St. Paul, Minn., president, Tri-State Telephone & Telegraph Co.
Runkel, F. H., Portage, Wis., secretary-treasurer, Portage Telephone Co.; president, Wisconsin State Telephone Association.
Ruth, Chester, Chicago, assistant sales manager, Frank B. Cook Co.
Saunders, G. L., Grinnell, Iowa, secretary, Interior Telephone Co.
Savage, W. J., Kinder, La., representing Southern Telephone Co. of Louisiana and South Arkansas Telephone Co., Hampton, Ark.

Schmidt, E. H., Indianapolis, Ind., receiver, Central Union Telephone Co.
Schuettge, Edward G., Chicago, treasurer, Frank B. Cook Co.
Scott, J. W., Warsaw, Ind., manager, Commercial Telephone Co.; general manager, Noble Telephone Co., Albion, Ind.
Shock, C. A., Sherman, Texas, secretary and general manager, Grayson Telephone Co.
Slingluff, W. H., Chicago, John A. Roebling's Sons Co.
Smith, C. E., Morenci, Mich., secretary-manager, Morenci Telephone Co.
Smith, H. B., Ashland, Ky., general manager, Ashland Telephone Co.
Soest, Henry W., Churubusco, Ind., president, Churubusco Telephone Co.
Steninger, J. A., Parker, S. D., president, Steninger Telephone Co.; president South Dakota Independent Telephone Association.
Stewart, R. L., Thomasville, Ga., vice-president and general manager, Consolidated Telephone & Telegraph Co.
Still, R. B., Tyler, Texas, secretary and general manager, Gulf States Telephone Co.; president, Texas Telephone Association.
Stoops, Claude R., Nappanee, Ind., owner-manager, Nappanee Telephone Co.
Sullivan, J. C., Creston, Iowa, president, Creston Mutual Telephone Co.
Swanson, D. A., Paxton, Ill., manager, Central Telephone & Telegraph Co.
Swartz, Howard, Ashland, Ohio, secretary and general manager, Star Telephone Co.
Tarte, C. E., Grand Rapids, Mich., general manager, Citizens Telephone Co.
Taylor, Arthur, Rhinelander, Wis., president, Rhinelander Telephone Co.
Taylor, W. O., Andrews, Ind., president-manager, Lagro-Andrews Telephone Co.
Tomlinson, Samuel, Plymouth, Ind., president, Winona Telephone Co.
Todd, H. C., Maryville, Mo., vice-president and general manager, Hanamo Telephone Co.
Trask, Clyde O., Saginaw, Mich., president, Valley Home Telephone Co.
Trumbull, Lyman Q., Fort Dodge, Iowa, secretary, Monarch Telephone Mfg. Co.
Uhl, Walter J., Logansport, Ind., secretary-manager, Logansport Home Telephone Co.
Wallace, E. E., Sandwich, Ill., secretary and general manager, Northern Illinois Telephone Co.
Warner, C. A., Monon, Ind., owner-manager, Monon Telephone Co.
Washburn, W. W., Goodland, Ind., manager, Western Indiana Telephone Co.
Weirich, P. J., Monroe, Wis., president and general manager, United Telephone Co.
West, A. T., Spokane, Wash., secretary, Independent Telephone Association of Washington.
Wilder, H. E., Angola, Ind., secretary, Home Telephone Co.
Wilson, W. H., Erie, Pa., general manager, Union Telephone Co.
Winter, W. N., Everett, Wash., president and general manager, Puget Sound Telephone Co.
Witwen, J. E., Prairie du Sac, Wis., secretary, Twin City Telephone Co.
Woodruff, A. P., Savanna, Ill., president-manager, Carroll County Independent Telephone Co.
Woodward, H. J., Woodward, Okla., superintendent-treasurer, Fort Supply Telephone & Telegraph Co.
Wright, John H., Jamestown, N. Y., general manager, Home Telephone Co.
Young, Fred A., Dowagiac, Mich., auditor, Cass County Home Telephone Co.

Mr. Sunny's Reminiscences

If Postmaster General Burleson should follow the precedent set by Director General McAdoo in ousting railroad presidents, B. E. Sunny would lose not one official head, but five, as he is president not only on the Chicago Telephone Company, but also of four other members of the central group of Bell telephone companies in Ohio, Michigan and Wisconsin. This he himself does not expect, and even if it does take place he does not look for the action for some time.

"I think the telephone people would be paying the committee and themselves a very poor compliment," he said, "if we assumed that the government intends to take the management of the complicated and delicate system of telephone communication out of the hands of men who have made it a life-study, and put it suddenly into the hands of men who know nothing about it.

"In any event, I am sure the committee will consider the latter for some time before acting, as did the railroad board."

Discussion of the possibility of Mr. Sunny's retirement has brought back to the memory of old Chicagoans the days when both Chicago and the telephone were in their primitive stages. Mr. Sunny began his service with the Chicago Telephone Company in 1879, as superintendent. Tucked away in his big mahogany desk is an age-yellowed little pamphlet, containing 300 names and numbers—Chicago's first telephone directory, issued in June, 1879. Before that time the few who had telephones called for the name of the party wanted.

"Central" knew everybody, and in all probability could add to the information: "They do not reply," a pretty fair guess as to why they did not reply, where they were at that moment, what they were doing there and when they would be back.

"Those were the days," says Mr. Sunny reminiscently, "when we had only one solicitor, and if he came in with two new subscribers' names at once the officials of the company all gathered round and congratulated him and each other. It was the hardest kind of work to get the 300 names that composed that directory."

Mr. Sunny began business life as a telegraph operator for the Atlantic and Pacific Telegraph Company in New York, in 1874; he came to Chicago as manager of that company's Chicago office in 1875, and was asked by the Bell Telephone Company to join them in 1879.

"I had not, however," said he, "any idea of what the telephone business meant. Nobody took it very seriously. When we built trunk lines for the downtown district, the stockyards and the lumber district, we added two telegraph wires and carried on a telegraph business between downtown and the stockyards, to get revenue to help support the telephone end of the business."

In 1888 Mr. Sunny, believing that the telephone business had about reached the limit of its possibilities, having at that time the tremendous total of 5,000 names in the Chicago directory, stepped out of it and entered the employ of the General Electric Company. Ten years ago he returned and has been at the head of the local company since that time. The Chicago Telephone Company has just installed its 500,000th telephone—as many as there were in the entire United States in 1900.

Burleson's First Local Problem

The first important question that has gone to Mr. Burleson and his assistants regarding local telephone subjects since the Government took charge, was dated August 13, and the disposition of it will be of considerable local interest.

The District of Columbia government was compelled to ask the director general of telephones and telegraphs whether large extensions of mains by the local telephone company through the streets and roads of Washington are absolutely necessary and essential at this time.

The Chesapeake and Potomac Telephone Company is engaged in putting in extension conduits through different parts of the District. Its present plans call for fully four miles of new underground mains from Wisconsin avenue along Albemarle street to Connecticut avenue; Connecticut avenue to Harrison street; Fourteenth street from Park road to Madison street; along Madison street from Fourteenth to Georgia avenue and at some points on Georgia avenue.

The street department, under Engineer Commissioner Knight, finds that this construction will leave fully four miles of cut-up macadam roadways to be repaired by the District, the District laws providing that all cuts in streets and roads shall be repaired by the District and the expense charged to those responsible.

Mr. Burleson is informed that the repairs to streets will cost $10,000 and take three months of steady work by a large gang of men. He is informed that obtaining labor is becoming a most serious problem for the District and that if the proposed extensions of telephone conduits are not absolutely essential they should be deferred or canceled.

Mr. Burleson or his executive committee will first refer the communication to telephone officials for report.

Compensation in the Railroad Case

Provisions Relating to Compensation in the Act Authorizing Acquisition of Rail Lines

BE it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President, having in time of war taken over the possession, use, control, and operation (called herein Federal control) of certain railroads and systems of transportation (called herein carriers) is hereby authorized to agree with and to guarantee to any such carrier making operating returns to the Interstate Commerce Commission, that during the period of such Federal control it shall receive as just compensation an annual sum, payable from time to time in reasonable installments, for each year and pro rata for any fractional year of such Federal control, not exceeding a sum equivalent as nearly as may be to its average annual railway operating income for the three years ended June 30, 1917.

That any railway operating income accruing during the period of Federal control in excess of such just compensation shall remain the property of the United States. In the computation of such income, debits and credits arising from the accounts called in the monthly reports to the Interstate Commerce Commission equipment rents and joint facility rents shall be included, but debits and credits arising from the operation of such street electric passenger railways, including railways commonly called interurbans, as are at the time of the agreement not under Federal control, shall be excluded. If any lines were acquired by, leased to, or consolidated with such railroad or system between July 1, 1914, and December 31, 1917, both inclusive, and separate operating returns to the Interstate Commerce Commission were not made for such lines after such acquisition, lease, or consolidation, there shall (before the average is computed) be added to the total railway operating income of such railroad or system for the three years ended June 30, 1917, the total railway operating income of the lines so acquired, leased, or consolidated for the period beginning July 1, 1914, and ending on the date of such acquisition, lease, or consolidation, or on December 31, 1917, whichever is the earlier. The average annual railway operating income shall be ascertained by the Interstate Commerce Commission and certified by it to the President. Its certificate shall, for the purpose of such agreement, be taken as conclusive of the amount of such average annual railway operating income.

Every such agreement shall provide that any Federal taxes under the act of October 3, 1917, or acts in addition thereto or in amendment thereof, commonly called war taxes, assessed for the period of Federal control beginning January 1, 1918, or any part of such period, shall be paid by the carrier out of its own funds, or shall be charged against or deducted from the just compensation; that other taxes assessed under Federal or any other government authority for the period of Federal control or any part thereof, either on the property used under such Federal control or on the right to operate as a carrier, or on the revenues or any part thereof derived from operation (not including, however, assessments for public improvements or taxes assessed on property under construction, and chargeable under the classification of the Interstate Commerce Commission to invest in road and equipment), shall be paid out of revenues derived from railway operations while under Federal control; that all taxes assessed under Federal or any other government authority for the period prior to January 1, 1918, whenever levied or payable, shall be paid by the carrier out of its own funds, or shall be charged against or deducted from the just compensation.

Every such agreement shall also contain adequate and appropriate provisions for the maintenance, repair, renewals, and depreciation of the property, for the creation of any reserves or reserve funds found necessary in connection therewith, and for such accounting and adjustments of charges and payments, both during and at the end of Federal control as may be requisite in order that the property of each carrier may be returned to it in substantially as good repair and in substantially as complete equipment as it was in the beginning of Federal control, and also that the United States may, by deductions from the compensations or by other proper means and charges, be reimbursed for the cost of any additions, repairs, renewals and betterments to such property not justly chargeable to the United States; in making such accounting and adjustments, due consideration shall be given to the amounts expended or reserved by each carrier for maintenance, repairs, renewals and depreciation during the three years ended June 30, 1917, to the condition of the property at the beginning and at the end of Federal control, and to any other pertinent facts and circumstances.

The President is further authorized in such agreement to make all other reasonable provisions, not inconsistent with the provisions of this act or of the act entitled "An act making appropriations for the support of the army for the fiscal year ending June 30, 1917, and for other purposes," approved August 29, 1916, that he may deem necessary or proper for such Federal control or for the determination of the mutual rights and obligations of the parties to the agreement arising from or out of such federal control.

If the President shall find that the condition of any carrier was during all or a substantial portion of the period of three years ended June 30, 1917, because of non-operation, receivership, or where recent expenditures for additions or improvements or equipment were not fully reflected in the operating railway income of said three years or a substantial portion thereof, or because of any undeveloped or abnormal conditions, so exceptional as to make the basis of earnings hereinabove provided for plainly inequitable as a fair measure of just compensation, then the President may make with such carrier such agreement for such amount as just compensation as under the circumstances of the particular case he shall find just.

Labor Comes Forward

Application of the McAdoo labor policies of the Railroad Administration to the telephone and telegraph administration was the request laid before Director General Burleson, August 20, by a committee of men and women representing the organized telephone operators of the United States. Specifically, the committee asked Mr. Burleson to establish a commission on wages and working condition similar to that in the Railroad Administration, which recognizes the right of the workers to organize and deal with employers through their chosen representatives.

Induction from Alternating Current Railroads

Presented at a Section Meeting of the American Institute of Electrical Engineers at Philadelphia

BY H. S. WARREN

A brief discussion of inductive interference in general is first given, including reference to the work of the Joint Committee on Inductive Interference in California. Inductive interference due to electrified railroads is then taken up and various possible means for reducing such interference considered. A description is given of four important installations of railroad electrification and the specific means adopted in each case for preventing interference, with the degree of success which has been met with.

TELEPHONE and telegraph companies in the conduct of their business not only have to maintain their lines and service against ordinary forms of interruption, such as lightning disturbances, mechanical failures, etc., to which all overhead electrical lines are inherently subject, but also, they have to see to it that their lines are protected against interference by electric power lines. Such interference may be due to actual or threatened physical contact between wires of the two systems, to passage of current from one system to the other by leakage, or to the class of disturbances known as "inductive."

One important kind of inductive disturbances on telephone and telegraph lines is that arising from installations of alternating current railroad electrification, such installations being principally employed in connection with trunk line railroads carrying heavy traffic.

In approaching the subject of interference to communication systems by such electrified railroads, it seems desirable first to consider some aspects of the general subject of inductive interference from power lines, of which interference from electrified railroads is a special case. In this general discussion of the subject it will be convenient to borrow freely from the work of the Joint Committee on Inductive Interference in California.

HISTORICAL

The induction of voltages in an electric circuit by current changes in a parallel circuit was discovered by Faraday in 1831. The property of self induction of an electric circuit was discovered by Joseph Henry at about the same time. The phenomenon of induced electrostatic charges was known already through various experiments. In 1838 Henry, in the course of his researches, observed that a current was induced in an electric circuit when a Leyden jar was discharged through a parallel circuit. This seems to be the first case on record of electric induction between circuits.

Since the time of Faraday and Henry a stupendous amount of electrical research and experimentation has been conducted and as a result of this and of brilliant theoretical work by Maxwell and others, the fundamental laws of electrostatics and electrodynamics have been very fully worked out. The general equations expressing the laws of induction are, however, not suitable for us in the solution of practical problems. On account of the large number of factors involved, many of which cannot readily be evaluated, it is generally necessary in specific cases to resort to simplifying assumptions and approximations.

As to what actually happens when a voltage is set up in an electric circuit by induction we know very little. It is well to bear in mind that we do not even know what voltage really is, or current, or electricity. We use these terms merely to express certain phenomena and relations found by observation, whereby we are able to derive results of much practical value.

Characteristics Affecting Disturbances. Telephonic currents consist of numerous component simple currents varying in frequency from about 200 to 4,000 or more periods per second. The signaling currents employed on telegraph lines are also complex, but their most important components are of less than 300 periods per second.

Power circuits are commonly of either 25 or 60 periods per second, but, in addition to the fundamentad periodicity, harmonics are usually present to a greater or less extent and it is due almost wholly to the harmonics which come within the range of the most important voice wave components, that noise is produced in telephone circuits by induction. By care in designing electric power machinery so as to reduce the proportion of such harmonics, it is probably feasible to avoid much of the noise disturbance to telephone circuits which otherwise would result. Thus a small expense in eliminating this trouble at its source may obviate a much larger expense later.

Abnormal Conditions. It is important to recognize that the inductive effects of power circuits are liable to be greatly magnified at times of abnormal conditions. The violent changes which occur in the electric and magnetic fields surrounding a power circuit, when one of its conductors breaks or becomes grounded, set up in neighboring communication circuits surges which may represent relatively large amounts of power. A parallel which, under normal operating conditions, causes no disturbance may produce very serious interference under abnormal conditions.

Balanced and Residual Voltages and Currents. In analyzing inductive phenomena it is advantageous to classify power circuit voltages and currents under two general heads: (1) Balanced voltages and currents, that is, those which are balanced or symmetrical with reference to the earth; (2) residual voltages and currents, that is, those which are wholly unbalanced with reference to the earth. The circuit of the residual voltages and currents is comprised of the metallic circuit conductors as a group, constituting one side, and the earth (including earthed conductors), constituting the other side.

At every instant the algebraic sum of the balanced currents, and likewise of the balanced voltages, is zero. Hence, at any instant the algebraic sum of the currents in the line conductors is the residual current and, similarly, the algebraic sum of the voltages to earth of the line conductors is the residual voltage. For example, in an ordinary railway circuit, consisting of overhead trolley wire and grounded rail return all the voltage and current are residual.

There is no definite relation between these two classes of voltages and currents and entirely different means usually have to be taken in counteracting their respective induction effects. In general, the residuals cause more inductive disturbance than the balanced components, as the residuals are all in phase and their effects are cumulative, whereas the induction from the balanced voltages and currents in one conductor is partially neutralized by

the induction from balanced components in each other conductor of the circuit. Also the residuals usually contain a larger proportion of harmonics than the balanced components and this is another reason why they are likely to cause more disturbance, particularly to telephone circuits.

Causes and Preventive Measures for Residuals. As residual voltages and currents are largely responsible for inductive interference, it is of great importance in the prevention of such interference that they be suppressed or reduced by all reasonable means available.

Star-connected, three-phase transformer banks with the neutral grounded will set up triple harmonic residuals due to variation of permeability of the iron with varying magnetic density and may also cause residuals by reason of inequalities of the transformer impedances. In general, the most effective measure against this triple harmonic effect is the use of a delta-connected secondary or tertiary winding, thus providing a shunt path for the triple harmonic currents. The magnetic density also should be kept as low as practicable. Residuals due to inequalities of impedances in transformer banks can, of course, be eliminated by equalizing these impedances.

Another condition which may produce large residuals is the use of generators with star-connected armature windings. When such a generator with its neutral grounded is connected to a power line, either directly or by autotransformers, residuals are set up in the line. When such a generator, with its neutral not grounded, is connected to the line through standard transformers, residuals will be impressed on the line if the transformer bank is connected star-star, the line side neutral grounded, and the station side neutral connected to the generator neutral.

Grounding of transformer or generator windings at any points not normally at zero potential, unbalances an electrically connected circuit and thereby causes residual voltages and currents.

Another important cause of residuals, which, however, may not be so obvious, is the unbalance of a power circuit due to inequality of the capacitances to ground of its several conductors. If the three line conductors of a three-phase circuit are carried throughout in the same relative positions, that is, if the circuit is not transposed, the capacitances to ground will be unequal and a part of what would otherwise be balanced voltage and current becomes residual. These inequalities may be overcome by transposing the power circuits throughout their entire length. To make such transposition effective with respect to interference to telephone circuits it is necessary that the power circuits be transposed at intervals which are short in comparison with the wave lengths of the higher harmonics present. The frequency of transpositions depends somewhat, however, on the inherent unbalance of the conductor configuration. As an indication of the number of transpositions required for a reasonable degree of balance to ground, it may be said that barrels of 6 to 12 miles, the latter applying to a triangular configuration, are usually adequate.

It is evident that the symmetry of a line which has been thoroughly transposed may be destroyed by connecting to it branches or taps which unbalance the capacitances to earth of the line conductors. Of course, if such a tap is grounded, the residuals resulting may be very large.

At times of accident, when a power circuit is in an abnormal condition, residuals of relatively enormous values are liable to be created. These set up correspondingly large induced voltages in parallel communication circuits. This emphasizes the importance of high grade construction and maintenance of power lines involved in parallels so as to minimize the frequency of such occurrences.

Unbalance of Communication Circuits. Not only are there these two kinds of disturbing voltages and currents on power circuits, namely, balanced and residual, but each of these components may set up, in a neighboring metallic communication circuit, two different effects: (1) an induced voltage between the two conductors of the communication circuit, which directly tends to cause currents through the signaling instruments; (2) an induced voltage between the conductors of the communication circuit and ground, which by reason of unbalances in the communication circuit indirectly causes currents through the signaling instruments. Theoretically, assuming a telephone circuit and all its connected apparatus absolutely symmetrical, electrically, with respect to earth and always so maintained, voltages induced equally in the two sides of such a circuit would not cause noise in the telephone. In practice it is not possible to attain absolute symmetry, although in well constructed and well maintained telephone circuits the degree of balance is very high, indeed. The telephone is, however, such a very sensitive instrument that no attainable degree of balance can avoid noise when relatively very high voltages are induced between the telephone wires and ground, as is done in many cases by parallel power circuits. It is therefore essential that induced voltages to ground be limited to values which are permissible on communication circuits so maintained.

Transpositions Within Parallels. Interference by induction from balanced currents and voltages can most readily be prevented by means of a coordinated system of transpositions applied to both power and communication circuits within the limits of parallels, the term "parallel" being understood to mean the region within which the two classes of line are in sufficiently close proximity for inductive disturbances to be set up in the communication circuits by the power circuits. It is to be noted that transpositions for this purpose to be applied to power circuits within the limits of parallels are quite distinct from the transpositions previously referred to as being necessary throughout the entire length of a power circuit in order to equalize the capacitances to ground of the several conductors.

Principal Factors in Determining Interference. Before leaving this general part of the subject I will enumerate the principal factors which determine the amount of induction and whether it is sufficient to constitute interference.

1. *The length of the parallel.*

Other things being equal, the longer the parallel, the greater the induced voltage.

2. *The separation of the two classes of lines.*

In general, other things being equal, the less the separation of the power line and communication line, the greater the induced voltage.

3. *Configuration of the power line.*

The investigations of the Joint Committee on Inductive Interference show that the configuration of the power line has an important bearing on inductive effects, the relative merits of different configurations varying with the separation of the power and communication lines, the spacing of the power conductors, and the relative importance of balanced voltages and currents. While it is not possible to draw a simple general rule for determining the most advantageous configuration the differences in particular cases are marked and deserve special attention,

as oftentimes substantial benefit can be secured in this way at small additional cost. This is particularly true of multiple circuit lines, the resultant induction depending largely on the relative poling of the power circuits.

4. *The magnitudes and fundamental frequency of the normal operating voltages and currents of the power circuits.*

The effect of electric induction, of course, is proportional to the voltage of the power line, and of magnetic induction to the current on the power circuit.

5. *The magnitudes of residual voltages and currents.*

It has already been explained that residual voltages and currents are a principal cause of inductive interference. Hence, while the amount of residuals on metallic circuits is usually small as compared to the balanced components, the inductive effects of the former are liable to preponderate.

6. *The wave shapes of both balanced and residual voltages and currents, involving the magnitudes and frequencies of all harmonics.*

The effect of wave shape on interference, to telephone circuits particularly, is exceedingly important. Wave shapes in practice on different power systems are found to have extremely wide variations. An unfavorable wave shape, *i. e.*, one having a large proportion of high harmonics, may produce a hundred times as much noise as a pure sinusoidal wave of fundamental frequency.

7. *The unbalances of the communication circuits, their magnitude, character and location.*

Such unbalances are caused by inequalities in resistance, inductance, insulation or capacitance to ground. The last mentioned quantity is balanced approximately by transposing the conductors. The other elements enumerated require proper design, construction and maintenance of these lines, whether in open wire or in cable, together with their connected apparatus.

8. *Terminal apparatus of the communication circuits and the distance of such apparatus from the parallel.*

The sensitiveness of the terminal apparatus is, of course, an important factor in determining the allowable amount of induced voltage. Also if the parallel is at a considerable distance from either terminal of the communication circuit, the induced voltages and currents may become considerably attenuated before reaching the receiving instruments.

9. *The voltages and currents of the power circuits under abnormal conditions.*

It has already been stated that the voltages and currents of power circuits under abnormal conditions, which are liable to be largely residual in character, produce the most severe inductive effects. The values of these quantities under abnormal conditions, in relation to corresponding values under normal conditions, vary a great deal on different power systems.

10. *The number of parallels which may effect cumulatively the same communication circuit.*

In many cases the same communication circuit, especially if it be on a long trunk line, may be involved in a considerable number of different parallels. In such cases the induction contributed by each parallel must be sufficiently restricted so that the cumulative results from all will not produce disturbances which cannot be endured.

11. *The importance and character of use of the communication circuit.*

It is obvious that the more important circuits, on which interference is most serious, should be afforded a higher degree of immunity from disturbance than circuits of less importance. Also, of course, the character of the communication circuit, as, for example, whether it is a telephone or telegraph circuit, is of fundamental importance in considering the question of inductive interference.

12. *The volume of transmission on the communication circuit.*

In case of a long distance telephone circuit, where the volume of transmission is small, a less amount of extraneously induced current will interfere with receiving than on circuits of less length where there is a large volume of transmission.

13. *The relative cost of preventing interference.*

While in all cases means should be employed which will allow adequate communication service to be given, still it is not expected that complete freedom from inductive disturbances can be attained. Any induced voltage, no matter how small, will generally cause some impairment of service. The amount of induced voltage which it is justifiable to allow depends to some extent on the difficulty and expense involved in further reducing such voltage. After the foreign voltage has been reduced to an amount which can, if necessary, be tolerated, it becomes simply a problem of balancing the value of further improvement against its cost.

It will be seen that the number of elements affecting inductive interference is quite large. Moreover, some of these elements, as for example, the wave shapes of the power circuit voltages and currents, are not ordinarily known, and have induction-producing values varying enormously in different cases. Hence the difficulty of formulating any simple method of determining in advance whether a given construction will or will not produce interference.

The foregoing discussion, while general in its application, is in many respects concerned with induction from power transmission lines. We will next consider specifically some of the inductive effects of alternating current railroad installations.

ALTERNATING-CURRENT RAILROAD ELECTRIFICATION

The reasons why alternating-current railroad electrifications cause large disturbances to neighboring communication lines, principally by electromagnetic induction, will now, I think, be apparent when it is considered that, (1) the railroad trolley current is large, (2) it is all residual current, (3) the railroad circuit, from its nature and use, is more subject to abnormal conditions, such as short circuits, than ordinary power transmission lines.

Classes of Interference. Some of the different ways in which disturbances due to alternating current electrified railroads manifest themselves in the telephone and telegraph plant, may be classified as follows:

1. *Interference with operation.*
   a. Interruption of service.
   b. False bell ringing.
   c. Noise.
   d. Interference with telegraph signals.
2. *Physical injury to plant.*
   a. Fire hazard.
   b. Magnetization of loading coils.
3. *Hazard to employes and to telephone using public.*
   a. Electric shock.
   b. Acoustic shock.

These various disturbances may be of a most serious nature and telephone and telegraph companies are unable by themselves to cope with the problem of protecting their lines and service against them. In order to make this more clear, we will review briefly some of the funda-

mental characteristics of telephone service and point out some of the distinctive features of the plant required to make this service possible.

The Telephone System. The fundamental electrical problem of telephony is three-fold:

1. The production of an electrical wave which is a faithful copy of the spoken word.

2. The transfer of this wave without appreciable delay over distances which may amount to hundreds or thousands of miles, without excessive change of form by distortion, without the accession of foreign disturbances, and without undue loss of intensity.

3. The production at the receiver of an audible sound wave which is an adequate counterpart of the electrical wave and, therefore, of the original spoken word.

As speech is carried on telephonically by means of an extremely small amount of energy, it is necessary that a large part of the telephone plant be of a sensitive and delicate construction. This includes the subscribers' sets where occur the delicate transformations from air wave to electrical wave and *vice versa.*

These substation instruments cannot be located at central offices where they would be under the immediate supervision of a trained staff, but they must be placed in the subscriber's office, factory, home or wherever they will be most available and convenient for his instant use. There are now over ten million telephone stations in the Bell System. These sensitive nerve ends of the telephone system are distributed throughout the entire country in every conceivable variety of location.

In addition to the delicate substation apparatus, each telephone conversation requires the exclusive use of a connecting circuit. Even though the circuit be hundreds of miles in length it cannot be used for any other telephonic purpose. This exclusive circuit must be low in resistance, capacity and leakage so as not unduly to attenuate the telephone wave. It must be so transposed, balanced and protected that so far as possible it will not pick up electrical disturbances from earth currents, telegraph lines or other telephone circuits or itself constitute a source of disturbance to the latter. The network of telephone circuits now comprises more than twenty-two million miles of wire.

In addition to meeting the above basic requirements, the telephone system, in order to realize its potentialities as a utility of the greatest benefit to the public, must include facilities such that at any time on request of a subscriber connections can be made between any two points, without delay or other inconvenience, and the charges for the service must be as low as possible. At present about thirty-two million such telephone connections are made per day in the Bell System.

Prompt, efficient and economical service on the existing scale requires that an immense number of separate circuits be brought together into common central offices and provided with every device and attendance which will facilitate traffic over the system. It requires, for example, that hundreds of wires be crowded into cables, the latest types of which have 2,400 conductors within a sheath whose outside diameter is 2⅝ inches. It requires great congestion of wires and apparatus in switchboards in order that many thousands of lines may be brought within reach of a single operator. It requires elaborate and reliable signaling arrangements to economize time and circuits. It requires uniformity in plant and methods throughout the entire system so as to make possible prompt connection between any two points. While it has been found practicable to devise means for transmitting the required signaling currents over the telephone plant safely, the danger of fires from the currents and voltages employed for signaling has been avoided only by the exercise of extreme care, although these currents and voltages are very small compared with the currents and voltages on power lines.

From this brief consideration of the telephone problem, showing that a large portion of the telephone system is inherently of a delicate nature and susceptible to interference, it is clear that telephone apparatus and circuits would be destroyed if but a small fraction of the powerful currents and voltages used by other electric utilities were permitted to enter into the telephone system.

Values of Induced Voltage. In studying the inductive effects of electrified railroads, it has been found advisable to determine approximately the amount of induced voltage in a communication circuit, per mile, per 100 amperes in the trolley, for different horizontal separations between the trolley and the communication circuit, and with different percentages of the trolley current in the rails. For example, it has been determined that, with 60 per cent rail current (that is, 40 per cent of the trolley current return flowing in the earth as stray current), the induced voltages per mile, per 100 amperes in the trolley, are in general about 10 volts, 5 volts and 1 volt, at 50 feet, 300 feet and 4,000 feet separation respectively. Thus at 50 feet separation, with 1,000 amperes in the trolley, a ten mile exposure would result in 1,000 volts induced. These are maximum figures in that they are based on the assumption that power is supplied in one direction only. It should be understood that the induction varies considerably in different cases since the induced voltages are affected by all the various conditions which go to determine the course that the stray current takes. Some parallelisms may extend more than ten miles and at times of short-circuit the current may amount to many thousands of amperes and, in such cases, the induction is liable to be correspondingly more severe unless preventive measures are taken.

The specific effects of these induced voltages will now be touched upon briefly.

Interruption of Service. Induced voltages may be high enough to operate the telephone protective devices and, if the current across the protector is sufficient, the line will become permanently grounded and the telephone service interrupted until the protector is restored to normal condition. If the protector is located in a central office, the time required to make repairs is relatively short, but if it is at a subscriber's premises, considerable time may be required for a repair man to reach the station. In cases where the operation of the protector does not actually ground the line, it may lower the insulation resistance, sufficiently to make the line noisy.

It may also sometimes happen that foreign voltage of a value below that required to break down the protector spark gap will yet be sufficient to puncture the insulation of the wiring at some point.

False Bell Ringing. Voltages of about 8, 20 and 200 volts, depending somewhat on the prevailing earth potentials, are sufficient to ring ordinary grounded bells, standard biased bells, and (by breaking down protector spark gaps) metallic circuit bells, respectively.

An accidental trolley ground on a 25-cycle single-phase electrification through a thickly settled community may ring scores or even hundreds of subscribers' bells, some of which may be located a mile or more from the railroad. Such false bell ringing is apt to be a source of serious complaint by subscribers, and is particularly annoying when it occurs at an unseasonable hour as, for example, 5 o'clock in the morning.

Noise. In order to appreciate the effect of small currents in producing noise in telephone circuits, it must be considered that a very small fraction of a microwatt of power at voice current frequencies will produce an audible sound in a telephone receiver and a few microwatts are sufficient for a telephone conversation in a quiet place. When the current in the telephone receiver caused by induction from outside circuits is large enough to produce an audible sound, it has an important effect on the efficiency of the circuit for transmitting speech, particularly when the circuit is used for talking over long connections so that the energy of the voice currents approaches the minimum which will give a satisfactory conversation. An extraneous sound which is scarcely more than audible to an untrained ear and might be thought to be of negligible consequence, has in reality, the effect of impairing a telephone circuit by a large percentage, or otherwise expressed, of destroying a material part of the circuit's value for service purposes.

The interfering effect of foreign current of a given magnitude depends very greatly, however, upon the frequency. The maximum effect is for current having a frequency of about 1,100 cycles per second. At lower frequencies the effect falls off rapidly, and at 25 cycles is probably only about one two-thousandth as great as at 1,100 cycles. This fact explains why the inductive interference to telephone circuits from 25-cycle railway systems is not predominantly noise. Twenty-five-cycle current normally has relatively very small components in the telephone-frequency range and the effect of these high-frequency components is damped out much more rapidly than that of the fundamental by separation of telephone and railroad circuits. Noise from such railways is, however, present to some extent, and is liable to become serious under any conditions which produce a bad wave shape in the power circuit.

Interference with Telegraph Signals. At 25 cycles, an induced current of one milliampere is liable, under some conditions, to interfere with ordinary Morse transmission, while rapid telegraph systems, printers, etc., are more or less impaired by extraneous currents of any value.

Fire Hazard. The use of heavy insulating coverings for wires in telephone switchboards is impossible on account of the necessity of bringing many lines within a limited space. It is not feasible to employ for this purpose such insulation as is considered good practice for electric light and power wires. Thus it is unavoidable that the dielectric strength of the telephone wiring be relatively low.

Investigations of the fire hazard due to foreign voltages impressed on telephone lines indicate that voltages of 200, or even less when backed by considerable power as in the case of induced voltages from alternating-current railways, create a distinct fire hazard.

Although the fire hazard brought about by railroad electrification is due chiefly to the higher voltages induced at times of short circuits on the railroad, it is possible that the repeated electrical stresses of lower voltage, due to normal railroad operation tend to decrease the dielectric strength of the insulation and thereby facilitate breakdown.

Magnetization of Loading Coils. Loading coils in very large numbers are now employed in both open wire and cable telephone circuits. These coils are liable to be permanently magnetized by any induced currents which are materially in excess of telegraph currents. While they are magnetized there is a considerable loss of transmission efficiency and it is ordinarily impossible to demagnetize them without removing them from the circuits. Moreover, large currents through the loading coils may permanently reduce the permeability of the iron cores and make them unsuitable for use on long toll cable circuits.

Electric Shock. At times of short circuits on the railroad and sometimes during switching operations, electrical surges may be set up in the telephone circuits, which are of sufficient intensity to produce electrical shocks to persons at the telephone or working on the circuits at the time. While it is improbable that such shocks will be the cause of serious personal injuries, even minor shocks are objectionable and constitute a basis of complaint as the public expects telephone instruments to be perfectly safe at all times.

Acoustic Shocks. Inductive surges such as are capable of producing electric shocks to persons are also liable to cause loud noises in the telephone receivers which may result in acoustic shocks to persons using the telephone at such times. Even the relatively slight clicks which sometimes occur due to battery interruptions may be very annoying to telephone users and acoustic shocks sometimes caused by induced voltages may be much more severe.

(To be concluded.)

Patent Office Report

The report of Commissioner of Patents J. T. Newton, for the year ended December 31, 1917, shows that the amount of money received by the Patent Office from all sources during the year aggregated $2,258,377.10. Expenditures during the year totaled $2,048,173.16, leaving a balance of $210,203.94 to pass to surplus. The total net surplus at the end of last year was $8,223,883.45. Commissioner Newton says:

During the year a total of 70,373 applications for patents, reissues of patents and designs, and 165,533 amendments in pending applications were filed. This represents a decrease of 660 in the number of applications and a decrease of 9,411 in the number of amendments filed.

The fees received by mail and express amounted to $1,316,145.31, and the fees paid by hand to the financial clerk amounted to $876,762.81. The number of letters indexed and filed, constituting the general correspondence of the office was 277,485. In addition to this, 26,015 letters of inquiry were returned with circulars of information answering the questions propounded. The number of parcels received by registered mail was 11,968, and the number of parcels by express was 3,474.

During the year 10,304 applications were forfeited by reason of failure to pay the final fee within the time prescribed by section 4885, revised statutes, and 1,628 applications previously allowed and forfeited were renewed. Since March 31, 1861, about 247,590 forfeited cases have become abandoned.

In the drafting division 993 drawings were made for inventors, who paid $3,494 therefor, and 6,861 drawings previously filed were corrected upon request by the inventors, for which the office received $5,519.35. Ten tracings were made at a cost of $18.50. The total fees received for work by the drafting division were $9,031.85.

In the assignment division 28,097 deeds, transferring the title to patents, etc., and containing 12,740,450 words, averaging 455 words per deed, were recorded . For this work the office received $48,034.01.

Typewritten copies of records aggregating 27,549,700 words were written, and other copies containing 2,554,600 words made by outsiders, were compared and certified by the office. For the whole of this work the office received $30,104.30. For the certificates attached to certain of these copies the office received $1,249.25, a total of $31,353.35.

Printed copies of specifications and drawings of patents to the number of 2,511,082 were sold at five cents each, bringing to this office on this account $125,554.10. For 1,277,184 copies sold to libraries the office received $1,612.50. The total received from the sale of copies of patents was $127,166.50. Copies to the number of 1,097,555 were shipped to foreign governments, and 142,640 copies were drawn for office use. The total number of printed copies of patents distributed during the year was 5,354,136.

Presenting Your Case Before the Commission

From an Address of the Wisconsin Commissions' Secretary Before Wisconsin Electrical Association

BY HAROLD L. GEISSE

THE utility desiring to obtain an increase of rates or the public desiring to contest an increase or to secure a reduction of rates usually confidently seeks the assistance of a lawyer, with a sublime trust in the ability of the legal profession to know what to do before any public body or on any public occasion. The lawyer, however, even though most skillful in the trial of cases before a court or jury, is very often as much at sea as his client on what to prepare for the hearing and how to present it. The result is that the commission is obliged to resort to an inquiry into the books and accounts of the company and to a statistical analysis of the operating performance of the plant for some years back or to extended service investigations in order to obtain facts upon which to determine whether or not the relief sought is justified, and in a fair percentage of the cases the record of the hearing is encumbered with a mass of irrelevant testimony, inexpert opinions and even vituperation, to which the commission has been obliged patiently to sit and listen.

One of the recurring incidents in the taking of hearings is the attempt to influence the judgment of the commission by the introduction of prejudicial matter. This is a method to be deplored, totally ineffective and unworthy of notice by opposing counsel.

The commission is not a court of law. Its business is to fix rates, to pass upon the character and quality of service, to pass upon rules and regulations under which service is given, to inquire into the methods of keeping accounts and the business management, to prevent the interference of one utility's lines and facilities with those of another, and to approve methods of construction. In performing these functions it is interested solely in finding out the facts. It is concerned in accounts, in operating statistics, in unit costs, in prices of materials and supplies, in values of property, in measurements and surveys, in traffic counts and in the opinions of experts.

One cannot attempt to outline a procedure for each character of case that may come before the commission. A service case will differ much in its method of presentation from a rate case, but, to illustrate how plain and matter-of-fact a case may be made, one can follow through in its simplest form a typical case in which rates are involved.

The elemental question in which the commission is concerned in a rate case is the determination of the value of the property used and useful in the service of the public. It is upon this fair value that the lump sum to be allowed as return is based. The lower the value found, the lower will be the rate schedule. In determining the ultimate fair value, the physical value of the tangible property, the amount of going value and the necessary working capital to be allowed must all be considered. The opportunity to affect the judgment of the commission commences with the engineering appraisal of the physical value of the property. The engineers of the commission have returned their report upon the physical value, and copies of the report have been submitted to both sides in the case. It is possible that in making the appraisal the engineers have overlooked some element of the property, have failed to allow for mishaps in building the plant which increased the money expenditure necessary to its construction, or to make allowances for other elements. On any of these points the commission would be glad to have enlightening testimony.

Having concluded the testimony on the physical valuation, the amount of going value and of working capital to be allowed are considered. The various theories of computing going value as discussed in textbooks, prior decisions and monographs of experts furnish a fertile field of inquiry for persons preparing to present a case before a commission, and the amount of working capital necessary to conduct any particular business is sufficiently vague and uncertain to afford the litigants opportunity to present very helpful testimony.

Completing the inquiry into the value of the property, an analysis of the expenses becomes necessary to determine that no improper charges are being included and whether or not the property is being fairly economically managed. If the case under consideration arises through a public attack on the rates charged, it is probable that the representatives of the public will be able to present little testimony of any considerable assistance. Frequently testimony is introduced showing that the rates charged by the company under attack are in excess of those charged by other plants similarly situated in communities of approximately the same size. Such testimony is usually of little significance because of the factors that make the amount of the investment and the operating costs vary in different communities.

If, on the other hand, the case arises through an application of a company for authority to increase rates, the company should be able to present a thorough analysis of its operating costs and earnings, together, if possible, with graphic charts showing tendencies over a long period. Prepared with sufficient care, such a statement can be of material assistance to the commission. Data relative to the degree of saturation attained in the community, presenting a statement of the traffic per capita and the gross earnings on the per capita basis, can frequently be shown with considerable effect.

In placing these data in evidence an officer of the company should be prepared to explain them in detail, answering any questions relating thereto that may be propounded either by the commission or by representatives of the public. Similarly, carefully prepared data should be provided for presentation in any service case, the object being constantly in mind to cut down the extent of inquiry that the commission must make independently after the hearing before decision can be rendered. With the figures carefully compiled, introduced and explained at the hearing, only such investigations would be required as would satisfy the commission of the fairness with which they have been compiled, their completeness and the safety with which conclusions may be drawn from them.

It is true that the commission has a more or less complete mechanism for the ascertainment of the facts in any inquiry it may be called upon to make. This is necessary in order that the evidence introduced in a case before it may be tested by subsequent independent investigation and that accounting and engineering assistance may be rendered to utilities and municipalities operating utilities.

It is taking an advantage of the commission, however, for a utility to presume that the possession of a staff of engineers, accountants and investigators renders it an available agency for the investigation of the utility's affairs when the utility feels itself in need of aid in the way of higher rates or relief from service requirements. The utility, having full access to its own books, records and accounts, should, before seeking relief, prepare itself to draw its own conclusions as to its needs and the reasons therefor and should be in a position to convince the commission of the fairness of its cause.

A somewhat different situation exists where the public invokes the jurisdiction of the commission in securing relief from high rates or inadequate service. There the complainant has not the machinery at hand to conduct its own inquiry, but is obliged to depend to a greater or less degree on the inquiries made by the commission. Even here, however, the person in charge of the case, be he city attorney or private counselor, should have a sufficiently well prepared outline to present clearly the issues he wishes to draw and the grounds for the public belief that relief is justifiable.

Telephone Bonds All Taken

Members of the syndicate which underwrote the $50,000,000 6 per cent convertible bonds of the American Telephone & Telegraph Company have been advised by the syndicate management that applications have been received for a comparatively small amount of bonds that remain on hand, so that the syndicate will be relieved of liability as underwriters. Subscription books will be held open until 10 a. m., August 14, for the purpose of giving an opportunity for placing bonds at the issue price, particularly to such participants as may wish to secure bonds, but who may not have subscribed hitherto because of the expectation of receiving bonds on dissolution of the syndicate. Bonds withdrawn from sale are still governed by the underwriting agreement that they will not be resold before October 1 unless sooner released by the syndicate managers.

The Myth of Government Ownership

Prediction that the railways will not be returned again to private ownership and such statements as that of Mr. McAdoo that it will never be done unless the people by popular vote demand it, are putting the thing wrong end to. The law explicitly provides for such return and in addition fixes a date as definitely as conditions permit.

The President was very explicit in his attitude to the same effect. Now any campaign for government ownership must be a definite and affirmative one. At present there is no government ownership and cannot be except through the election to Congress of men favoring that idea as a permanent policy. The working out of government war operation will furnish much argument for both sides; and there must be some two years of working under peace conditions, although they will be very abnormal. The real probability is that there must be a serious and profound investigation of causes, what has been done, and results, conducted by Congress like the Newland's committee plan, which was abruptly stopped by war. It is very premature as yet to enter into discussion and prediction.

History is making itself and while results will have become apparent, the relation of cause and effect will be the subject of profound study. It is probable that remaining in private ownership will at least be accompanied by a vastly improved method of government regulation and a readjustment of relations.

Meantime, whether it is the director-general, or a Hearst writer or an economist like Cook, or whoever it may be, he is prejudicing his cause and taking away all value from whatever he says, when he assumes and tries to make the public believe that we are now entrenched in government ownership, and that any opinion against it is reactionary. The burden of proof is on government ownership, because it is distinctly non-existent, and is solemnly disavowed by law. The law declares that government operation is a war measure and shall cease at a given time.—*Railway Review.*

"Davy" Lewis

From the Lancaster, Pa., Intelligencer.

Don't know Davy Lewis! Well, Davy Lewis is a little, sawed-off, hammered-down Welshman. By occupation he is a coal miner. So was David Lloyd George, prime minister of England, the big man of the British empire. Well, Davy Lewis either came from the same section as Lloyd George or his forebears did. Anyhow, Lewis was for many years a coal miner in the fields of Maryland. He was a good coal miner. Now the coal fields district of Maryland is the one strong Republican Congressional district and a Republican congressman had been returned so often that it was hard to get a Democratic candidate. Largely because no one would take the place, Lewis was placed on the Democratic ticket. Result—the coal miners, of which Lewis was one, flocked to his standard and when the vote was counted, Lewis was elected to Congress and he was re-elected and re-elected and he grew in mental and political stature, as the years went by. His hobby in Congress was nationally owned phones and telegraphs. He preached it from the rostrum and from the housetops. But his preaching was in vain.

Having made so many friends, David was prevailed upon to run for the U. S. Senate. The Democratic organization pooh-poohed him, but when the votes were counted on primary day, Lewis had been nominated by a big majority. But the Old Guard Democrats and big business still had their inning. The Republicans nominated a man, who had just married millions and, on general election day, the great Democratic machine of Baltimore came under the wire like a quitter. How much of the newly acquired wealth, if any, of the Republican nominee was scattered in the pathway of the Democratic machine leaders will never be known. Anyhow, Lewis, champion of the people, a worker himself, an advocate of public ownership of "wires" was nosed out.

And Davy Lewis returned to his old haunts, ready to take up the pick and shovel. But he had been such a student of government as applied to all the people, that he was drafted by President Wilson on one of the many commissions. There he labored as none other, quietly, unassumingly. His friends had almost forgotten there was a Davy Lewis. Then war necessity required the taking over of the "wires." The question of who was to direct them became a big question. This man was suggested; that man was suggested. No one seemed to give a thought to the *one* man in the nation for the job, save the *one* man who ought to—the president.

So Davy Lewis will direct the "wires." And, if he is left alone, the American people will never have complaint about the service.

BY HERBERT S. HOUSTON

Member of the Chamber of Commerce of the U. S. A. on Economic Results of the War

Copyright 1918 by Doubleday Page & Co.

Chapter VIII—Fighting Foreign Wars at Home

ONE of the manifest advantages of economic pressure as an international force is the way in which it can be applied. Each of the nations in a league can apply it instantly from within and the moment the announcement is made that an embargo has been declared, pressure begins to be exerted. It is not necessary to spend billions of dollars and years of time in building armament and creating armies, as is the case in developing effective military power. The modern world is prepared to exert economic power instantly. Preparation has been made through the agencies of commerce and in every nation machinery is at hand through which economic pressure could be applied. The stock exchanges, the cables, the wireless, the international postal service and the wonderful modern facilities, already referred to, for communication and intercommunication constitute this machinery. It is worldwide in its extent and it would become operative the moment a league of nations decided to set it in motion.

This marked advantage, which economic power possesses over military power, has never been appraised at its full value. But one needs only to read the briefest survey of the time and money required to organize military power in England and the United States during the great war to be convinced that at least in this important particular of immediate availability, economic power has an overwhelming advantage. As Secretary of War Baker stated in his testimony before the Senate Committee on Military Affairs, even with the aid of a draft law it required all the time between April, 1917, and January 1, 1918, to raise the armed forces of the United States from 9,524 officers to 110,856 officers and from 202,510 to 1,428,650 men. And despite the fact that the manufacturing power of the nation was being exerted to the utmost to equip this army during the period in which it was being mobilized, the time was not sufficient to bring this equipment to the proper standard at the beginning of 1918. Military power today represents not merely man power but the organized industrial power of a nation. That has been established in the experience of every belligerent country and it is now everywhere conceded. Even when the military power is organized and equipped, a considerable time is required, for the transportation of men and supplies, before it can be effectively used. Warships and transports must be sent across the sea or endless trains must bear soldiers and munitions to the scene of hostilities before military power can be employed to advantage. But economic power, on the other hand, as has been pointed out, can be applied instantly from within by every nation and its effect becomes instantly apparent.

This comparison is not developed as an argument against military power but only to make clear the fact that economic power in the modern world has certain clear and great advantages over military power. In most of the proposals for a league of nations to follow the war, the use of military power, either exclusively or as a last resort, is provided for. In the programme outlined by the League to Enforce Peace, economic pressure is presented as an international force to be used before military force is employed. So it becomes pertinent to outline the advantages possessed by economic power, although making clear that it should never be looked upon as the final but only as a preliminary power. There is strong reason to believe, however, that in many cases the use of economic pressure as a preliminary power would be sufficient to bring a recalcitrant nation to a world court for a settlement of its differences, thus avoiding the use of military power altogether.

In addition to the agencies existing today through which economic pressure could be applied, new agencies would doubtless be formed in connection with a league of nations. An international clearing house has been proposed as an essential piece of machinery for the service of commerce in any world organization that would follow the war. An able Chicago banker, John J. Arnold, vice-president of the First National Bank of that city, a man who is considered a master of the intricacies of international exchange, has long urged the desirability of an international clearing house. Such a clearing house would settle balances between nations just as our modern clearing houses now settle balances between banks in cities in which they are located. Beyond question such an international clearing house, when established, would quickly become a powerful auxiliary agency in the League of Nations, helping to give it stability and serving, when occasion arose, as a new instrumentality by which economic pressure could be applied.

When Mr. George B. Cortelyou was secretary of the treasury in President Roosevelt's cabinet, he proposed that international gold certificates might be secured by gold depostis made by the various commercial nations and that these certificates could be used in settling trade balances, thus avoiding the delay and danger of transporting the actual gold. The Federal Reserve Banking System, which has been working with distinct success in the United States, might suggest a model for an international banking system to accomplish the purpose which Secretary Cortelyou had in mind. If this took the form of an international clearing house, in which each nation should make deposits of gold in direct proportion to the volume of its foreign trade, it is manifest that a piece of powerful international machinery would be established that could perform prompt and important service for a league of nations. As an illustration—if a nation sought to make war, in defiance of its pledge to seek adjudication of its differences before a world court, it would, as an automatic penalty, forfeit its gold deposits with the International Clearing House and also its trading rights and privileges as a member nation. The procedure and penalty would be similar to the suspension or expulsion of a member by a stock exchange.

Such a clearing house would be an agency to aid in preventing war and, what is even of greater importance, it would be a powerful agency to aid in promoting peace. For the advan-

tages of being a member of such a world clearing house would be so great—in fact, so vital,—to every nation that it is hard to believe that they would be surrendered, except as a final resort in a desperate situation. The alternatives would be the way of law and honor, with trade advantages held, or the way of war and broken faith, with trade advantages lost. To cause a nation to pursue the second way would require the force of such an overwhelming demand for war, among its own people, that nothing could resist it. Of course such a situation is not only conceivable but it is one that will recur, until the practice and the spirit of peace have become part of the consciousness of the world.

Chapter IX—War Prevention Versus War Cost

ONE apparently strong and valid argument to be brought against the use of economic pressure is that it would bring great loss to a nation applying it. And that is true. But it is equally true that this loss would be far less than the loss brought by war. The appropriations of the United States for war purposes in 1915, a year after the great war broke, but two years before we entered it ourselves, were $158,000,000. For the year 1918 the war appropriations have already reached the great total of $7,527,338,716. This vast sum, fifty times greater than the sum appropriated in 1915, represents the war cost for only a single nation. The annual cost of the war of all the nations engaged in it is many times that sum. And the total cost of the war from the beginning represents a sum equal, undoubtedly, to the value of all the products of all the belligerents for a generation. At the beginning of 1918 it was estimated, after careful computations, that the cost of the war to Germany represented one-third of the total wealth which the German empire had built up through centuries. And the cost to the other nations is relatively as great. In comparison to the staggering sums involved, the loss to commerce from the application of economic pressure would be extremely small. This woul be true even if the entire export and import trade of all the belligerent nations should be sacrificed.

In 1912 the imports of France amounted to $1,588,553,000, and the exports to $1,295,528,000. The imports of Germany for the same year were $2,544,557,000 and the exports $2,131,718,000. The imports of Austria-Hungary were $722,030,000 and the exports $554,973,000. For the United Kingdom the imports were $3,623,794,000 and the exports $2,371,073,000. Italy's imports were $714,471,000 and exports $462,607,000. Japan's imports were $308,258,000 and exports $261,258,000. The United States had imports of $1,653,265,000 and exports of $2,170,320,000.

These great totals represent much less than the yearly cost of the war to each of the belligerents. The official figures issued by the United States Treasury Department, giving the cost of the European war up to August 1, 1917, showed that the expenditures of the United Kingdom aggregated $26,705,000,000, and that the daily war cost was $25,000,000. For France, the total expenditures had been $16,530,000,000, with a daily war cost of $18,500,000. For Italy the aggregate cost was $5,050,000,000, with a daily expenditure of $7,000,000. With the Central Powers, Germany had made aggregate expenditures reaching $19,750,000,000, with a daily cost of $25,000,000, the same daily cost as that of Great Britain. Austria-Hungary had war expenditures that equalled $9,700,000,000, with a daily war cost of $13,000,000. As 1918 opened, the daily cost of war to the United States had mounted to the same great total of $25,000,000.

The statement of these figures makes clear the wide disproportion between the cost of war and the cost of preventing war through the use of economic pressure. But manifestly it is a false assumption to say that the nations in a league would have all their outgoing and incoming commerce destroyed when they joined in applying economic pressure to a recalcitrant member. The most that could happen would be the total loss of trade which each nation in the League had with the nation against which economic force was being directed. To some degree this loss would be met by increased trade among the nations of the League with each other but for the purposes of a comparison we shall give to war the benefit of every possible doubt and assume that the entire volume of trade which the recalcitrant nations had with other members of the League would represent a complete loss. Even on this basis it is apparent that the cost of a war that might possibly be avoided is very greatly in excess of any conceivable loss that might be entailed through the application of economic pressure.

The trial balance that is being considered is of commerce alone and no account is being taken of the destruction of life and the other great human losses that come with war. But this strict commercial accounting shows a heavy debit against war.

A criticism has been made of the use of economic pressure by Mr. Hamilton Holt, the able editor of *The Independent*, and by others to the effect that the burden, in applying economic pressure, would be borne unequally by the signatory nations. It has been pointed out that a small nation, in a given case, might suffer a greater trade loss than a large nation, and this is possible. But this inequality can be met by making the share of the total loss of trade which each nation would bear directly proportionate to the amount of its foreign trade. By thus prorating the loss on the basis of the ability of each nation to bear it absolute fairness would be secured. The League of Nations which would apply the economic pressure could equitably determine the amount of the resulting loss which each nation should assume. Even if this were not done the loss to each nation would be far less than the loss which would be entailed by war; so, it is reasonable to expect, few controversies would arise from the distribution of the loss suffered in preventing the damage and destruction of war.

Chapter X—Women, Children and Embattled Nations

IN addition to the loss that would be suffered by the nations applying economic pressure, the objection most strongly urged against its adoption by a league of nations is that its effect would be heaviest on non-combatants. This objection will not stand before analysis. For, as the less cannot exceed the greater, economic pressure alone, as a preliminary force to prevent war, will never be so hard on women and children and other non-combatants as economic pressure in time of war, reinforced and intensified by all the other rigors of war.

Belgium and Northern France, Siberia and Rumania, every country that has been occupied by an enemy in this war, offers pathetic and overwhelming proof of the suffering which war brings to non-combatants. In many ways it is suffering with a sharper edge than that borne by soldiers on the fighting line. War as it has been waged by Germany is no respecter of persons. The Bryce report presents damning evidence of the grievous wrongs done the women and children and old men of Belgium, wrongs that have gone to the point of bearing many of them away to servitude. And this record has been matched in Poland, Armenia, Serbia and Rumania, at least as far as physical suffering is concerned.

The strikes which broke out in Berlin and Vienna early in 1918 were due largely to the sufferings which war had brought to workers and their families, far behind the battle lines. The blockade had hemmed Germany in completely from the sea, and pressure through lack of food and other supplies was greater on civilians than on the soldiers and sailors. This has been due to the fact that the latter are being looked after by all

the belligerents even before the needs of women and children are considered. For such is the imperious rigor of war that nothing is permitted to stand in its way. The case is fully established by this war that economic pressure affects non-combatants quite as much as it does combatants, and that, in addition, they have to bear many losses and dangers that are peculiar to war.

This objection, moreover, seems to wholly overlook the fact that economic pressure is proposed as a sanction to put behind international courts so that their use will be compelled in the settlement of differences between nations and law be substituted in the place of war. If economic pressure against a nation succeeds in a given case, and war is avoided, it is clear that that nation has escaped contending with the military forces of the other nations, as well as with their economic forces. In all wars, the first, indeed the immediate, result is commercial non-intercourse, which is economic pressure in the most complete and hostile form. So it is plain that a nation at war suffers, both through its combatants and its non-combatants, from all the losses and ravages of war, including economic pressure.

But there is even a broader argument to bring against this stock objection. The present war has shown for all the world and for all time that the old distinctions between combatants and non-combatants have largely disappeared. Wars are no longer limited to the fighters on sea and land. Embattled nations are drawn up on continental battle lines. Industries fight. Women and children and old men make munitions. Railways and steamship lines are organized and devoted to war uses. Everything and everybody is mobilized. The Red Cross forms children and women, as well as men, into a great army of mercy behind the lines, drawn from every village in so vast a country as the United States. Hoover, through the Food Administration, outlines menus which an opinionated and self-reliant democracy accepts with scarcely a protest. Garfield specifies the number of shovels of coal that can be fed to the furnace and marks the temperature the household thermometer should register. And when the President issues an order taking over all the railroads, a country that has been grounded in the sacred right of property and always believed that individual initiative was the American's birthright, does little more than mark the day. All this means simply that we perceive, as England and France and Germany, that all the belligerents have perceived, that war today is a surging, resistless struggle of all the human and industrial and financial power of every nation engaged.

It is the overwhelming consciousness of this all-inclusive nature of modern war that has developed the strongest argument that has ever been presented in favor of abolishing war. In a truer way than we are apt to grasp, war is destroying war. This is not a pacifist idea, but one that is based on nature's primal law and need of self-preservation. Men see that the enginery of war which they have created, largely in the last generation, will destroy themselves. The sub-marine, the airship, the poisonous gases, the curtains of fire, the tanks, the great guns—they have been loosed from the brain of man and are running wild in the world like beasts of the jungle, seeking whom they may devour—and they have found man, their creator. Not only are they destroying him, but they are destroying also the civilization he has slowly reared through the centuries. It is this hideous, hydra-headed monster of war which the democratic nations are convinced that Germany is responsible for and they are determined to slay it, for the protection both of Germany and of themselves.

Chapter XI—"The Power of the Purse"

FOR centuries nations have used economic pressure for accomplishing the most fundamental reforms in their own governments. It has been steadily operating in Germany to produce results that are almost revolutionary. Von Bethmann-Hollweg resigned as the imperior chancellor of Germany in July, 1917. There was much discussion as to the reasons for the resignation, but there was no mistaking the fact that the force which compelled it was "the power of the purse," exerted in the refusal of the Reichstag to pass the war credits asked for. So powerful a minister as the chancellor, who had been able to stand against Von Tirpitz and the Junkers on a number of vital questions and who had the support of the kaiser, could not resist the economic pressure applied by the Reichstag. And when the kaiser named Dr. Michaelis as his successor, without consulting his parliament, he created so many difficulties for him that he could not last the year out. Having in its control the power before which Von Bethmann-Hollweg had to bend and break, the Reichstag was able to exact from the new chancellor a pledge that it would be consulted on all important questions of foreign policy; and it forthwith put the agreement to the test by committing Dr. Michaelis to its formula of a pease without annexations and in the reply to the note of Pope Benedict it enforced the inclusion of its own peace resolution embodying this formula. But although this second chancellor was willing to bend under pressure, he incurred the ill will of the Reichstag on a number of his acts, especially in his indifference or tacit approval toward the propaganda Von Tirpitz and the Fatherland party spread through the army, and he had to go. Then an unprecedented event occurred, one fraught with promise for a democratic Germany, or, at least, for a Germany in which the people will have larger control of their government. Count von Hertling, called to the chancellorship by the kaiser, delayed his acceptance until he had consulted leaders in the Reichstag and been convinced that he could secure a majority support. This was equivalent, practically, to confirmation by the Reichstag, much the same, at least in effect, as the confirmation of the appointees of the President of the United States by the Senate, or to the vote of confidence in a new French minister by the Chamber of Deputies. So here is responsible government finally taking form in Germany, in the stress of war, through "the power of the purse." If Germany can employ economic pressure to make her own autocratic government, supported by an archaic constitution, responsive to the people in a much greater degree than ever before, Germany could assuredly employ economic pressure as a force to maintain world peace, as a member of a league of nations. And Germany, with a responsible government controlled by the people, has been considered at all times as a nation qualified for membership in such a league by President Wilson, ex-President Taft and other leading statesmen among the entente allies. It would be a significant and impressive illustration of the effectiveness of economic pressure if, largely through its power, Germany was able to accomplish such reforms within, that it could become part of a league that would employ economic pressure to secure and maintain peace throughout the world. But such an illustration would be but one of many repetitions of history. The contest in Germany, between autocratic power, represented by the emperor and his ministers, and the Reichstag, representing the people, is strangely similar to the long contest, of three centuries ago, between the king and Parliament in England. And the two contests for responsible government, to be controlled by the people, are identical in the force employed by the people to gain their ends. In both cases that force was "the power of the purse," a phrase first coined in the bitter struggle against the English crown led by Hampden and Pym in the Commons.

A force that produced results favorable to the people, in England and in Germany, and in many other countries as well, would appear to be fashioned for effective use by a league of nations. And economic pressure applied against a single nation by a league of nations would be much more powerful and much

Postmaster Working on Portland Merger

Data covering complete details of the proposed merger of the Pacific Telephone & Telegraph Company and Portland (Ore.) Home Telephone Company systems are in Washington, having been dispatched to Postmaster-General Burleson by Claude McCulloch, acting for Oswald West, receiver of the Home company. The postmaster-general's request for full information regarding the plans of consolidation followed telegraphic communication between himself and Mr. McCulloch a few days ago.

Unless new angles develop, Postmaster-General Burleson will offer no serious objection to the proposal, in the opinion of Mr. McCulloch. Since the exchanging of telegrams, R. W. Montague, labor adjuster for the United States Shipping Board for Portland district, who has been in Washington on business in connection with the board, appeared before the postmaster-general on request of the parties interested in the proposed merger. Mr. Montague, as attorney for the Home Telephone Company, participated in formulating the proposal and with his knowledge of the facts was able to present the matter fully before Mr. Burleson. Advices from Mr. Montague indicate that there will be no hitch in the merger plans.

As a step in the proposed consolidation, the Bell company a few days ago petitioned the Federal Court to modify an order made March 26, 1914, restraining the company from further absorption of competing companies. If the postmaster-general gives his definite approval and authorizes the consolidation, there will be nothing in the way to prevent the Federal Court in modifying its order, in the opinion of Mr. McCulloch.

R. S. Howard, chairman of the Portland committee of bondholders of the Home company, says the plans of the proposed merger meet with the approval of the bondholders and that they are ready to co-operate in completing the consolidation, if authority is granted by the postmaster-general.

Contingent upon the ability to obtain materials and labor, the physical merger of the two systems can be accomplished within a year, it is believed.

Wood Poles Have New Enemy

Worm or fungus, which ever it may be, constitutes a new menace to wooden wire-carrying poles, which the experts at the Geneva, New York, Experimental Station are studying. The "what-is-it" was discovered the other day in Geneva by workmen employed by the Empire Gas & Electric Company. The discovery was an accident but it may prove to be a most important find not only for the telephone company but for other pole owners and farmers.

Bug or fungus, that is the question that is bothering the experimental station experts. It may be one or both. At any rate, a thorough investigation is being conducted by the company while the experts are analyzing and searching to find the root of the evil.

The workmen were about to change a pole in Geneva when they made the discovery. The pole was a large one and apparently perfectly sound, but when the men began to work upon it it snapped off a few inches above the ground and an investigation showed that the center of the pole had been cut almost as cleanly as with a saw, showing, however, that something had been at work upon it. A search for the worm or whatever it might be failed to disclose it and, not being etomologically inclined either through training or desire, they reported the incident to the company officials, who passed the bug to the Experimental Station with the query: "What is it?"

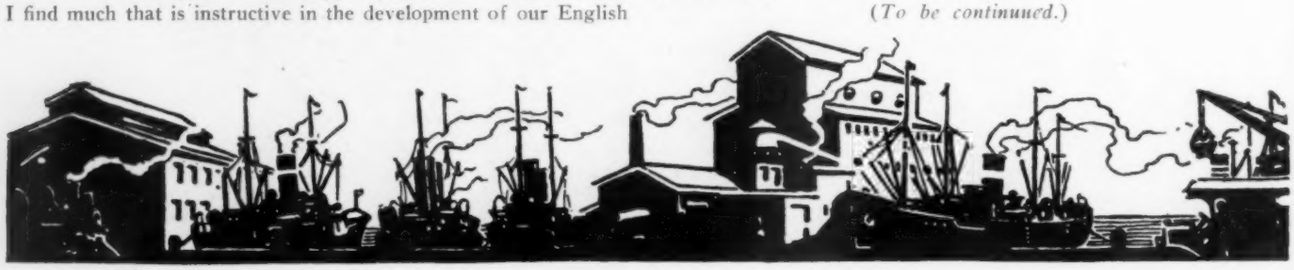
The experts believe that it is a new one. They confessed that they were not willing to give a snap decision. How far the menace may have reached the company doesn't know but every one of its thousands of poles is being tested. It is hoped that a coal tar or other preparation may checkmate the trouble maker, but if it has reached far, steel poles may have to be used where practicable. It is feared that the worm or fungus may be working on fence posts and as soon as the mystery is solved the Experiment Station will issue a bulletin, or otherwise advise what to do if they consider the case warrants it.

---

quicker in producing results than it has proved to be when applied by part of the people of a country—it is never all of them, but only a majority—against their government.

The English minister of blockade, Lord Robert Cecil, has presented some extremely interesting data from English history that bears on this point. In a statement issued early in 1918 he said he was convinced that the economic weapon would prove a most useful arm for the enforcement of the League's decrees. "Every student of the League of Nations idea," he said, "finds certain difficulties at the outset. One of these is how the decrees of such a league can be enforced. It is natural to draw an analogy between the growth of international law and order and the growth of law and order within an individual country, and, while I admit that such an analogy must not be carried too far, I find much that is instructive in the development of our English commonwealth from the state of anarchy that existed over a long period after the War of the Roses. How did a strong English king finally gain ascendancy and control over the warring barons? He instituted a central body which enforced decrees on the barons largely by economic means. I am convinced that that is the line upon which a league of nations may hope to proceed effectively. My experience in the present war has taught me the great power of an economic weapon. How would a league of nations use it? Well, for example, if any nation went to war with another, without submitting its dispute to international consideration, it would forthwith be cut off from commercial intercourse with every member of the League. That would be a tremendous weapon and one that few if any nations would care to defy."

(To be continued.)

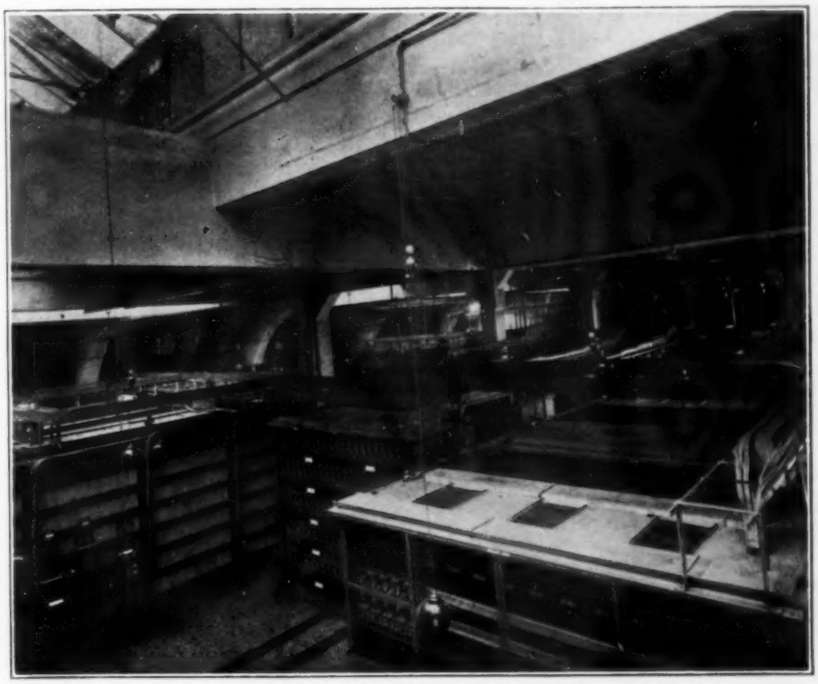


Automatic Installation at Leeds, England

Description from London Electrician of Largest Automatic Exchange in That Country

BY J. HEDLEY

THE Leeds Automatic exchange, recently brought into service, embodies the latest developments in automatic telephone exchange working, and is the largest in England. The plant is housed in a new building of fireproof construction in Basinghall street. This building comprises five floors, including the basement. The superintending engineer and the district manager's staff occupy the basement, first, second and a portion of the third floor. The automatic plant is fitted on the fourth floor, and a portion of the third floor is reserved for growth.



General View of Trunking Sections, Indicating Cabling and Lay-out of Automatic Plant.

The equipment provided is as follows:

(*a*) 6,800 primary line switches, fitted on 68 units, with floor capacity for accommodating 15,000 lines.

(*b*) 900 secondary line switches arranged in 45 divisions of 20 switches each.

(*c*) 840 1st selectors fitted on 5 boards.

(*d*) 810 2nd selectors fitted on 5 boards.

(*e*) 730 3rd selectors fitted on 5 boards.

(*f*) 740 connectors fitted on 68 units shown under (*a*).

(*g*) 290 repeater circuits for calls to manual board from subscribers.

(*h*) 40 repeater circuits for calls to manual board from distant exchanges dialling in.

(*i*) 20 repeater circuits to Leeds telegraphs for phonogram calls.

(*j*) 100 repeater circuits for calls incoming from distant exchanges dialling in on high resistance circuits.

(*k*) 2 charging sets, motor 220 volt 50 cycles two-phase, generator 300 amps. at 65 volts.

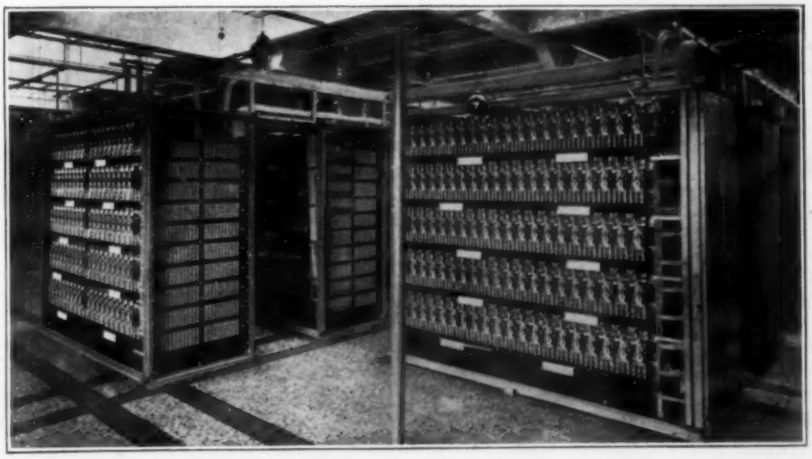
(*l*) 2 ringing machines, one driven from supply mains, one from 46 volt battery.

(*m*) 2 46 volt batteries, each 1,588 ampere hours capacity.

(*n*) 6 test clerks' testing positions.

TRUNKING SCHEME

Of the 68 primary line switch units, 46 have 10 trunks each, and 22, 20 trunks each, a total of 900 outgoing trunks. Each of these trunks is cross-connected to a secondary line switch, in a different division, each such division having access to 10 first selectors. This scheme of distribution spreads the traffic more uniformly over the whole group of first selectors; *e. g.*, the 10 secondary line switch divisions 31 to 40, each fitted with 20 secondary line switches, are associated with the 10 outgoing trunks from 20 primary line switch units of 100 lines each—each one of the 10 trunks being connected to one secondary line switch in divisions 31 to 40, thus enabling each 100 subscribers to have a choice of 100 first selectors. The 900 secondary line switches have access therefore to 450 first selectors, the remaining 390 first selectors are directly associated with junctions from Leeds manual board and distant exchanges, for the completion of calls direct by means of dials associated with the cord cir-



Second and Third Selector Switchboards. The former on the left, and latter on the right.

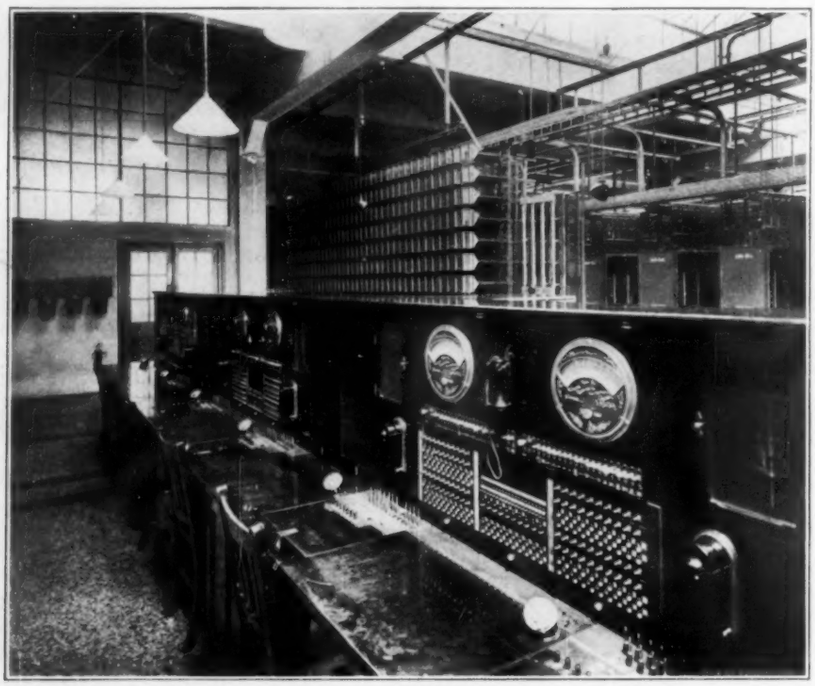
cuits at these exchanges. From each of the 840 first selectors the 10 levels have outlets to deal with the following classes of traffic:

Level 0—Calls to Leeds manual board for trunk and junction calls from subscribers and distant exchanges.

Level 9.—To second selectors for calls to inquiry and for test and official calls.

Levels 8, 7, 6, 5, 4, 3 *and* 1. *Dead Levels.*—Reserved for growth at Leeds and for subscribers' circuits at Roundhay, Stanningley, Chapeltown, Morley, Headingley, and other sub-exchanges in the Leeds local area—when automatic working is extended thereto.

Level 2.—To second selectors for calls to Leeds subscribers at present numbered 20,000 to 27,299—21,500 to 21,999 and 27,300 to 29,999 at present spare.



Six Testing Positions and Main Distribution Frame.

The exchange is of the full automatic Strowger type for a five-figure system. Each subscriber's line terminates on a primary line switch circuit which, when energised by the removal of the receiver, extends the subscriber via a secondary line switch to one switch out of a group of selectors. This apparatus receives the impulses from the subscriber's dial for the first digit, and extends the line to a second selector to accept the impulses for the second digit, similarly a third selector deals with the third digit and finally a connector receives the tens and units digits and connects the calling subscriber to the wanted line.

Trunk and junction calls originated by subscribers are obtained by dialling "0," and 200 outlets are available for this service. These lines terminate on manual positions in the Leeds trunk exchange; fitted with a multiple of the junctions and short trunk circuits outgoing to other exchanges, so that, as far as possible, a "no delay" service for such calls will be effected. "Long distance" calls are ticketed and mature from a group of additional positions in the Leeds trunk exchange, each position being fitted with a group of junctions outgoing to the automatic exchange; 223 junctions to the automatic exchange are available, each terminating on a first selector switch. Calls from distant sub-exchanges for Leeds subscribers are dialled direct by the sub-exchange operators; 144 circuits are operated in this manner, each circuit terminating on a first selector in the automatic exchange. To obtain trunk and junction calls over these circuits the sub-exchange dials "0" and obtains the manual operator in the Leeds trunk exchange; 40 circuits, separate from those used by subscribers, are provided for this purpose. This group of lines is marked to indicate to the Leeds operator that the call is from a sub-exchange and will be controlled at that point.

The manual board in the trunk exchange also deals with calls originated by call office subscribers, so that the necessary fee can be collected. Two 100 line-switch units are set apart for this service, the trunks outgoing from these units being wired so that immediately the receiver is taken off the hook the caller is connected to the manual position. The circuits are therefore dealt with precisely on manual lines for originating calls. Calls incoming to such numbers are, however, dealt with automatically in a similar manner to an ordinary automatic subscriber. Coin-box and party-line subscribers are deal with on a full automatic basis. The former have access to a separate group of "0" level circuits for trunk and junction calls to indicate to the operator that the coins should be deposited before the connection is established. For calls to automatic subscribers the apparatus at these subscribers' offices is designed to short circuit the transmitter, when the called subscriber replies, until the penny is deposited. The party line subscribers are arranged on a two-party line basis, one subscriber, "X," being rung on the "A" line and the other, "Y," on the "B" line; each subscriber is allotted a separate number in a different hundred group, the connector switches of the "Y" group being arranged to ring on the "B" line instead of on "A" line as for other switches.

Originating calls from party line subscribers are dealt with on a line switch common to the two subscribers and mature similarly to ordinary direct subscribers.

The necessary electrical energy for operating the automatic exchange switches and providing the talking current for the subscribers' instruments is derived from a 46-volt storage battery. This battery is in duplicate so as to eliminate any risk of breakdown, one battery is kept charged whilst the other is in service. The batteries are charged by a motor generator set driven from the electric supply mains.

The automatic exchange equipment embodies the latest developments in automatic telephone exchange working.

1. Facilities are available on primary line switch units for cross-connecting subscribers' lines to any line switch, thus affording means for distributing the originating traffic equally throughout the exchange.

2. Secondary line switches are fitted between the primary line switches and first selectors, to enable the originating traffic from each group of 100 subscribers to

be spread over a larger group of selectors. This scheme provides for the distribution of the traffic more uniformly over the entire exchange, and so affords better traffic conditions.

3. When the called subscriber is engaged, a "busy back" tone is given to the originating subscriber; if the engaged subscriber is called from the manual board, a "busy" flash signal is transmitted to the operator's cord circuit.

4. When a called subscriber replies, the ringing current is tripped immediately.

5. The number of routes incoming to any unit can be varied without altering the permanent wiring. Increases in load incoming to any unit can thus be dealt with by merely inserting a connector switch on one of the spare multiple banks provided.

6. The meter of the originating subscriber is operated for completed calls between two automatic subscribers only.

7. Each switch, and the outgoing and incoming routes for each switch, are so designated as to enable calls to be traced backwards or forwards to the next switch without difficulty.

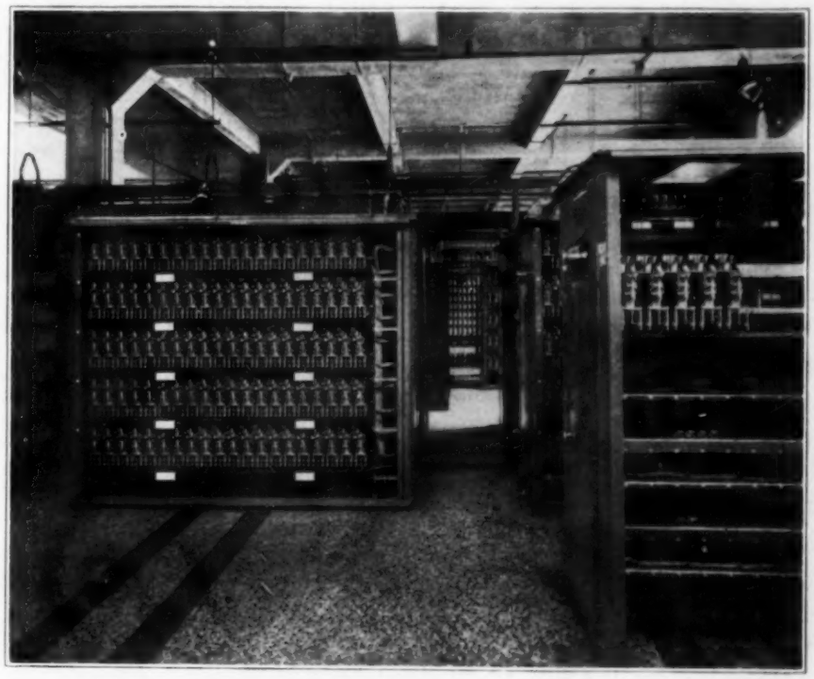
8. An alarm circuit is extended to the manual board during the night and on Sundays, when no engineering staff is on duty in the automatic exchange. The alarm is associated only with those circuits which actually affect the working of the exchange such as fuses blown and failure of ringing.

9. The master switch controlling the line switches associated with each primary and secondary switch unit, can be removed without displacing the line swtiches.

10. Standard positive supervision is afforded on the manual positions in the Leeds trunk exchange on all calls to and from automatic subscribers. Similar facilities are afforded to the sub-exchange operator dialling direct on the automatic exchange.

Of the primary line switchboards, each unit accommodates 100 primary line switches in four groups of 25 each. Of the illustrated group of first selector switchboards, that on the right accommodates 100 first selectors used by sub-exchanges dialling in direct. Another view shows second selector switchboards on the left and third selectors on the right. The former shows very clearly the terminal assembly provided at the end of the switchboard, to enable variations in the trunking scheme to be made to meet the traffic to be carried. The 20 groups of terminals are arranged in two vertical groups of 10 levels, 0, 9, 8, etc., to 1, one group from the levels of the switches on the left of the selector switchboard, and one from the switches on the right. The six testing positions at the front and the fuse side of the main distribution frame and primary line switchboards in the rear are also shown, as well as a general view of the plant to indicate the cabling scheme and general lay-out of the plant.

The whole of the automatic equipment was manufactured and installed by the Automatic Telephone Manufacturing Company, Liverpool, in accordance with a specification prepared by the engineer-in-chief of the post office, Sir William Slingo. In addition to Leeds, automatic exchanges rendering public service now exist at Accrington, Blackburn, Chepstow, Darlington, Dudley, Epsom, Hereford, Newport (Mon.), Paisley and Portsmouth. Much depends on the working of the Leeds equipment, which may be considered as a fair representation of the service conditions to be rendered at other large provincial towns, and its behavior will be watched with keen interest by all concerned.



First Selector Switchboards in the Leeds, England, Exchange.

Girl Operators Replace Jackies

Naval officials at Great Lakes, Ill., have come to the conclusion girls make better telephone operators than men. Therefore the twenty-one yeomen who have been acting as operators are to be succeeded by fifteen expert "hello girls." Where the sailors worked in three shifts a day of seven men each, the girls will do the same work in three shifts of five.

The girls were selected from the best operators at the city exchanges of the Chicago Telephone Company. They have just completed a two weeks' period of special training for the particular needs of naval telephone business. They are employed as civilian workers, and not enlisted as "yeomanettes." The twenty-one yeomen whose places they are taking will soon be sent for active service as seamen aboard ship, which is a second reason for employing girls, to follow Secretary Daniels' order to eliminate "land sailors" wherever possible.

The girls' first shift went to work Saturday night, August 24, immediately after the central telephone office of the naval station was transferred from its quarters in the administration building to the new postoffice building, near the main gate. An up to date twelve position switchboard is installed in the new exchange. The girls will handle all the calls of 46,000 enlisted men and officers. The average is 12,600 calls every twenty-four hours, and the maximum is about 15,000 a day. There are 525 telephones at the station.

European Telephone Practice

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

CHEMICAL AND PHYSICAL THEORY OF THE LEAD STORAGE BATTERY. — Although sixty years have passed since the Frenchman Planté first discovered the lead storage cell, nevertheless the theories as to the chemical action of that cell and its physical characteristics are just as much the theme for controversies as was the case in the first decades after the discovery of the battery.

According to Planté, the reactions in his cell were very simple. At the positive electrode some peroxide of lead was produced and at the negative electrode some metallic lead. After several series of charges and discharges a sort of paste of lead made up the negative, while the positive was formed by a rather thick deposit of peroxide of lead. The capacity of the element of course varied, depending on the thickness of the two elements. But it did not take a very long time before scientists began to see that this seemingly so simple theory was in reality fairly complex and that it was unable to explain all the phenomena of charge and discharge satisfactorily. The result of this discovery was the rise of a number of theories tending to explain the action of the cell. When we consider the immense usefulness of this cell in all kinds of electrical, telegraph and telephone work, it seems almost impossible to believe that the theory of this cell is still as undecided as it really is.

Faure, who was the first one to utilize Planté's discovery practically, believed the chemical reaction to run: $2\,Pb + 2\,PbO_2 = Pb_2O + Pb_2O_3$, indicating the production of a sub-oxide of lead at the negative and some minium (red lead) at the positive.

The theory which has become classic is that of Gladstone and Tribe, which does not admit of a simple exchange of oxygen between the two electrodes, but rather of a sulphatation of the two electrodes. The discharge would then be expressed by the equation: $PbO_2 + 2\,H_2SO_4 + Pb = 2\,PbSO_4 + 2\,H_2O$.

Drewiecki finds only one equivalent of SO_4 produced per ampere hour, instead of two, as expressed by the previous equation, and hence known as the theory of double sulphatation. He believes in the production of a lead anhydride Pb_2O_5, which would combine during the charging process with oxygenated water, which is likewise constantly formed and would eventually yield $Pb_2H_2O_7$, analogous to permanganic acid. This perplombic acid would constitute the depolarising agent. The experiments of the French committee at Anvers confirmed the theory of simple sulphatation of the negative, leading to a total variation of the plates equal to 64.16 grams per 36.5 amp. hrs.

The theory came again into prominence during the research of the author for a cell with invariable and immobile liquid which would be less subject to breakdown than the older type of cell and therefore of prime importance at the present time, when economy of materials is so essential.

The principal controversy in all the older theories dealt with the composition of the active positive matter, a composition on which depend the reactions which are produced as much by the charging as by the discharging of the cell. The first step in the investigation of the new theory proposed by the author was to take some cell particles from a positive electrode that had been charged to its limit, to wash the cells thoroughly and to dry them at a temperature not above 35°C., avoiding changing the composition of the material. The strong depolarising properties of this matter aroused the belief that the product was very unstable. Then the chemical and physical properties of this electrolytic peroxide were compared with the properties of the peroxide of lead, prepared chemically. The results obtained are given in the following table:

	Peroxide of Lead	*Electrolytic Peroxide.*
Restivity in arbitrary units	22	1
E. M. F. with zinc	0.7 to 0.5 V.	2.4 V.
E. M. F. with lead	0.3 to 0.2 V.	2.0 V.
Color	dark brown	jet black
Chemical analysis	PbO_2	Pb_3O_7
Oxidizing properties	does not reduce when cold in hydrogen	reduces with evolution of heat

This table shows that the active positive matter is not the lead peroxide, but that the positive discharged matter is lead peroxide, as was also shown by experiments with a cell using the electrolytic peroxide. The double sulphatation theory therefore cannot be applied, since it gives to the positive charged matter what really belongs to the discharged matter.

In trying to uncover the chemical make-up of the electrolytic peroxide, most authors give it chemical formulae that are richer in oxygen than the PbO_2. Some of these are Pb_4O_9, Pb_3O_7 and finally Pb_2O_5. All of them correspond to the type formula Pb_nO_{2n+1}, with the values of n differing. These superoxides seem to be due to the combining of Pb_2O_5 with one or two molecules of PbO_2. It is possible to calculate a priori the weight of these oxides needed to furnish 1 amp. hr.

Various Oxides.	*Molecular Weight.*	*Proportion of Pb to PbO_x*	*Weight of Oxygen freed to make PbO_2*	*Weight per Amp/hr to make PbO_2*
PbO_2	239	0.866	16 g (53 Amp/hr)	18.2 g
Pb_4O_9	972	0.853	16	13.6
Pb_3O_7	733	0.847	16	9.3
Pb_2O_5	494	0.841	32 g (106 Amp/hr)	5.0
$Pb_2O_5; H_2O_2$	528	....		

In order to find out which of these oxides approaches the black electrolytic peroxide, it is sufficient to discharge a positive, containing a known weight of matter. This experiment was made by making use of two negatives to oppose the positive, making the negatives 30 times as large in capacity, so that the discharge is clearly limited by the positive. The experiments gave results showing 7.86 grams of active matter per ampere hour. There would therefore be needed 316 grams of this matter to liberate 16 g. of oxygen. If we substitute the proper values in the constitutional equation given before, we get a value close to Pb_2O_5. The presence of strongly oxidizing products formed normally at the end of the charge at the positive: persulfuric acid, oxigenated water and ozone, has contributed in giving to the electrolytic peroxide an oxidation capacity greater than it really possesses. It seems quite probable that the depolarisation of the positive is due to the Pb_2O_5, as Drewiecki assumed. The real reaction of the lead storage battery can now be stated as follows:

At the negative: $Pb + H_2SO_4 = PbSO_4 + H_2$.

At the positive: $Pb_2O_5 + H_2 = 2\,PbO_2 + H_2O$.

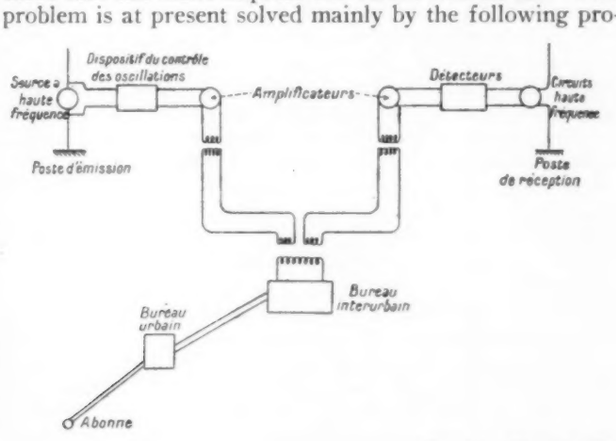
This shows that the theoretic weight of lead necessary at the positive is double that needed at the negative. In practice, manufacturers use the positive much thicker and heavier than the negative. Experiments have also shown that the weight needed at the negative to produce 1 ampere hour is 9.9 grams lead, instead of the 3.84 grams required theoretically.

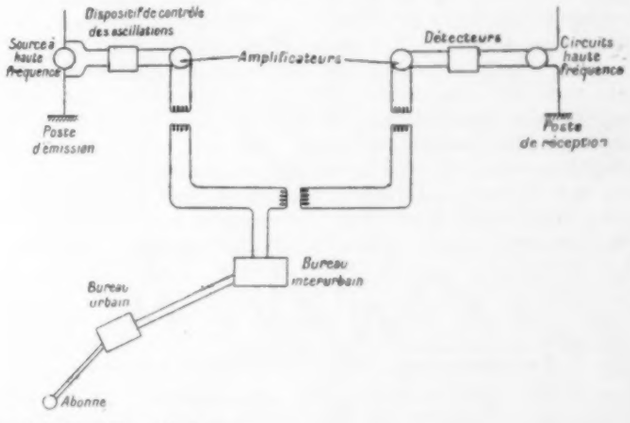
It is now possible to obtain an idea of the physical properties of the cell. Charged, the cell contains in its cell particles only substances of high electric conductivity, spongy metallic lead at the negative and Pb_2O_5 at the positive. As soon as the cell begins to discharge the surface layers are the ones most active, which explains the instantaneous change in the color of the plates. Discharged, the same element contains materials only slightly valuable as conductors of electricity: $PbSO_4$ at the negative and PbO_2 at the positive. During the following charging process the reactions are: $PbSO_4 + H_2 = Pb + H_2SO_4$ at the negative and $2\,PbO_2 + O = Pb_2O_5$ at the positive. It is only when the element is charged to the limit of its capacity that the positive takes on that beautiful jet black color of the Pb_2O_5. The excess of negative matter that must be employed is due to the need of leaving in the cell up to the end of the discharge process some spongy metallic material which can carry the current into the portion of the cell rich in $PbSO_4$, which has only a very slight value as an electrical conductor. Hence the very important recommendation never to leave a discharged battery at rest without having it recharged, for neglect of this would lead to complete sulphatation of the entire negative mass, rendering the future use of the cell, if not impossible, at least very difficult.

One of the principal arguments in favor of the theory of double sulphatation is the agreement between the theoretical calculations and the practical experiences regarding the thermochemical results. It is the absolute conviction of the author that the positive does not sulphate at all during a normal discharge, but that it is a mere coincidence that the calculated value agrees with that observed during reaction. According to Thomson, the sulphatation of lead of the negative liberates 73,800 calories. The total reaction of the element furnishes 89,230 calories. Consequently the formation of Pb_2O_5 at the positive during the charge absorbs 15,430 calories and the change of Pb_2O_5 to Pb_2 returns it during the discharge process. This is not at all astonishing in view of the great unstableness of this body, which is without doubt one of the most energetic oxidizing agents known in chemistry. On the other hand, we know that the peroxide of lead is relatively stable, since its production starting out from lead liberates 12,140 calories.—Ch. Féry, Professor of Physics at the Sarbonne, *Revue Générale de L'Electricité*.

Some Points in Wireless Telephony

WIRELESS telephony offers the following problems: 1. To produce in the sending antenna oscillations of high frequency, whose amplitude is constant, or at least causes variations of frequencies no greater than those that can make impressions on the human ear. This problem is at present solved mainly by the following proceedings, which allow the generation of oscillations obtained as follows: Lamps with three electrodes for low power stations; arcs, alternators, high frequency generators for powerful stations.





Figs. 1-2. Plans for Wireless Telephone Transmission.

2. To vary the amplitude of the high frequency oscillations in accordance with the modulations of the intensity of current produced by the human voice, speaking through a transmitter. In the case of low power stations, the microphone is placed in one of the circuits of the generator lamps, which are ordinarily employed in groups, whose individual elements are wired in parallel. For more powerful stations lamps of large dimensions are used. The microphone current, having to react on circuits of high frequency, is the subject of a change to current of low frequency. The high frequency currents whose amplitude follows the variations corresponding to those of the microphone current is also amplified. For very powerful stations having a long reach, the Alexanderson amplifier is used, and similar devices give the solution for the problem of microphonic control of oscillations.

3. Finally it is necessary, as is the case in the use of the ordinary telephone, that no manual action be necessary to change from transmission of messages to reception and vice versa. Once this problem also is solved, the wireless telephone can be treated exactly like an ordinary telephone relay; but this relay will at times be a gigantic plant which transforms the telephonic messages transmitted by wire into wireless telephone messages. When the various problems are solved in practice, the wireless telephone can be utilized just the same as the ordinary telephone is at present, and any subscriber can use it at will. The suppression of all manual action to

pass from transmission of messages to reception of the same can be obtained in various ways. It is evidently possible, if we assume as in wireless telegraphy that the sending station and the receiving station are separated by a sufficient distance, so that the syntony, and provided the signals from the sending station, be not of such type as to interfere with the receiving of messages at the receiving station. The general plan may be one of two following, shown in Figs. 1 and 2, according as the two sending and receiving stations are in series or in parallel with the wires which connect them to the telephone exchange.

The above problems have now been solved to all practical purposes and have made wireless telephony possible. But the one drawback that has prevented wireless telephony from taking that advance standing in the communication of messages that wireless telegraphy has is the interference by outside influence with the sending of messages. The trouble is that this interference by disturbing waves and factors is of much greater influence in this branch of wireless communication. These so-called "parasites of the air" are the troublesome factors that make it necessary to employ such powerful generators for comparatively slight distances.

Let us compare the transmission of a wireless telegraph signal with a wireless telephonic communication. A signal is a series of oscillations of constant amplitude which will still be legible even when interfered with by parasites whose amplitude attains the value A, for which the transmission voltage is V and the power factor P. A spoken letter, on the contrary, will be a series of oscillations of extremely variable amplitude, following the form of the microphonic current produced by the emission of sound waves by the voice (Fig. 3). In order that the letter pronounced by the voice be not distorted, the greater part of the modulations, likewise of quite small amplitude, will have to reach the other station with an intensity A necessary in order to overcome the interference of parasitic waves. But under these conditions, the amplitudes will have to attain at the receiving station at certain moments the values $3A$, the necessary power for transmission being $9P$ and the voltage $3V$. These efforts are noticeably increased by the fact that, in contrast to telephone currents over wires, the radiotelephonic waves are not distorted during propagation, and because the voice lends itself better for transmission across interference waves than a series of radiotelegraphic signals.

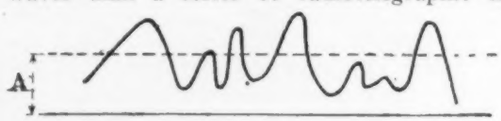


Fig. 3. Sound Waves of the Spoken Voice.

Nevertheless the power that is needed to reach a certain point is greater in wireless telephone work than in telegraph work. If in the latter case 500 kw. are needed in the antennae, the antennae of the former would have to produce 2,000 kw., and this has as yet not been reached in any of the present day stations.

We find that we can draw the same conclusions for wireless telephone work as we have drawn for wireless telegraphy, namely, that only stations with great power can hope to cope with the problem of interference waves and the efficient transmission of speech across space. Will it always be so? Is it not possible to reduce the intensity of the parasites in comparison with the useful waves? The solution of this problem can be sought in two directions.

In the first place, we will have to remember that the energy sent out by the antennae is spread into space in all directions around the sending station. The greater part of this energy is lost in space, while an extremely small portion is caught by the receiving antennae and used. If, instead of being spread out into space, the energy were concentrated at an angle of perhaps 10°, five on each side, in the direction of the other station with

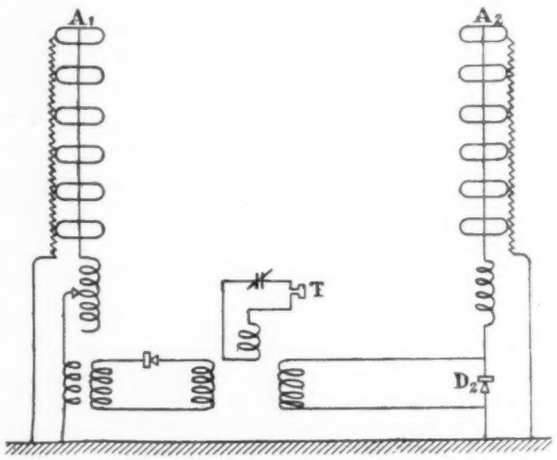


Fig. 4. Installation to Reduce Interference Waves.

which communication is had, then the energy per unit surface for a given distance would be 36 times as great as undirected energy. Moreover, the intensity of the parasitic interference waves would not be changed either and conditions would be greatly improved. The reverse installation at the receiving station would in its turn reduce the power of the interference waves in comparison to the useful waves, eliminating all the interference waves coming from directions other than those that are actually favored by the installation giving directed energy. Several authors, among them Blondel, Marconi, Braun and others, have paid much attention to directed energy. As concerns the possibility of obtaining increased wave effects, it was shown some years ago that it is sufficient to employ a certain antennae, composed of identical vertical wires, placed in the same plane, of a total length equal to two wave-lengths, in order to reach a definitely directed energy for electrical waves. Bellini favors an installation comprising 50 couples of antennae, half a wave-length apart, which he claims will have even more favorable results.

A second method that has been attempted to eliminate the parasites of the air seeks to diminish the amount of energy needed for larger distances and attacks the interference waves direct. There are two ways of handling this matter:

1. One can try to diminish the relative intensity in the receiving circuit in proportion to those of useful nature, employing arrangements that will reduce the intensity of current in proportion as the latter themselves are more intense. In this way an interference wave that is of greater intensity than a signal wave will be reduced much more intensely. This solution only reaches half its mark, though, for it ignores those interference waves that are less intense than the signal waves.

2. The second method uses an auxiliary antennae alongside of the ordinary antennae, reducing the parasitic waves and tending to make them less effective.

3. The third method has for its object the prevention of arrival of the parasitic waves at the receiving an-

tennae itself. The following scheme, shown in Fig. 4, is the invention of the Dutch scientist, Cornelius de Groot, and combines the two latter solutions, applying the second to the oscillating interference waves and the third to the aperiodic parasites. Two identical antennae A_1 and A_2 are placed close enough to each other, so that they are affected in the same manner by the parasitic waves, and sufficiently far enough apart so that the currents produced by the antennae A_2, which is made aperiodic by the use of the detector D_2, shall not influence antennae A_1.

The antennae A_1 is tuned with the incidental wave and coupled in the usual manner with the circuit of the detector D_1, which corrects the signals and the parasitic waves and transmits them then to the telephone T of the station. The antennae A_2 is tuned with the same wave-length or with a wave-length a little greater than that of antennae A_1, which makes it less sensitive to signal waves and more sensitive to interference waves. This antennae being above all aperiodic, it is impossible to hear over it even the faintest signals. But the strong signals sent by the varying wave lengths and the parasitic waves produce a current of the same order of magnitude as in the antennae A_1 and compensate in telephone T_1 the corresponding signals coming from A_1. The coupling of transformers can be so arranged that compensation is perfect.

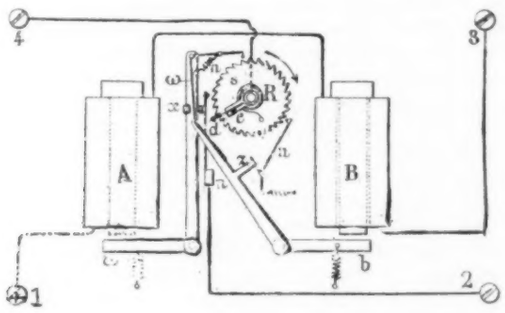
As to the aperiodic parasitic waves, they are stopped before they reach the antennae by devices set around the antennae and called Dieckmann cages. A certain number of frames or cages of conducting wires are placed perpendicularly near the antennae, along their whole length, and connected with each other and with the earth by a conductor wire of great resistance. These cages act like Faraday cages and consequently are perfect screens for constant or slightly varying charges (aperiodic parasites), while they do not stop the Hertzian waves composed of electromagnetic waves, whose electrical field is perpendicular to the points of the frames or cages.—*Annales des Telephones.*

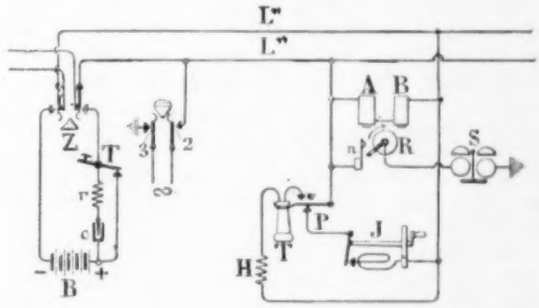
A New Telephone Selector Used in France

THE object of this telephone selector is to allow the telephone operator to call the subscribers on a party wire by ringing their telephone, without disturbing any of the other parties on the line. The selector here described was adopted a few years ago for the Paris telephone system and has given excellent satisfaction.

It is composed primarily of a ratchet wheel R, carrying a contact finger d as also a spiral spring which is locked when the wheel turns in the direction of the arrow (Fig. 5). The pawl y which operates the wheel is retarded by a spring m, when the arm w is no longer retained by the extreme end of the lever b, which in its turn is operated by the electromagnet B. The pivot of y will then be found at the extreme end of the lever a, operated by lever A. When the current passes through A and B, the levers swing about and the pawls y and u engage with R. The electromagnet A has a resistance of 1,300ω, that of B has a resistance of 2,500ω or more. The core of the latter is encircled by a copper tube which serves to retard action in such a way that A releases only when short interrupted current impulses are sent. Each of these current breaks makes the wheel advance by one ratchet until d comes in contact with n, which results in the ringing of a local telephone bell.

If the current is cut off, the pawls disengage and the wheel returns under the action of the spring to the balancing position determined by the arm c, which carries a set screw. The system can therefore be regulated so as to have the contact work after n—number of current breaks. The tension to be applied to the two coils A and B is around 38 volts for a current of 10 milliamperes. Below this figure the action is rather uncertain. Fig. 6 shows the wiring of the selector R and the bell S. J represents the magnetic call, P the hook switch of the subscriber. At the telephone exchange there is a key Z, which, when pressed down, sends current from the cell B to the line and the selector. The key T is used to produce the desired number of current breaks to call the different subscribers by their various number of rings. The spark is shunted over a resistance r of 100w and a condenser C of 2 microfarads. Dr is a change-off key analogous to Z, but whose contacts are branched over a magneto instead over battery cells. The working of the selector is very simple: If A wishes to call B, he calls the exchange; the operator works the selector at B's telephone and completes the circuit in the usual way. When conversation is ended, A and B merely hang up their receivers and the telephone system returns to its original position. The electromagnets of the selector having a great reactance for the frequencies used by telephone currents use up very little current. Thirty of them can be shunted on the same line without fear of trouble. The only inconvenience of the system is that it does not safeguard privacy of conversation, as the other subscribers on the line need only take off their receivers to listen in on the conversation.—*Journal Telegraphique et Telephonique.*





Figs. 5 and 6. Wiring of Telephone Selector.

The Copper Shortage in Germany

COPPER is employed in Germany only for very urgent work, which means only for military work. In all other cases it has been displaced by two other metals, namely, zinc and iron. In spite of the difficulties that this substitution has occasioned, the Germans claim that they have succeeded in making the substitute metal do in many places where formerly copper was used.

Iron Conductors: For overhead wire conductors either bare iron wires or iron cables are used. The results obtained with them are summarized as follows: 1. It is recommended to use iron cables for sections greater than 6 mm., because iron wire is not flexible enough to be used here advantageously. 2. Before being placed in the ground the wire or cable should be rolled by proper machines. This is very essential if one wishes to avoid the formation of faulty spots in the wiring and cables, which will lead to breaks. 3. In order to prevent the formation of rust, great care must be taken to examine the wire after stringing to see that the galvanizing is not damaged, especially near joints. 4. Where cables and wires meet, soldered joints are permitted, but the soldering must be done very carefully. It is recommended to wash the soldered joints with a solution of water and lime, to dry them carefully, and finally cover them with a layer of tar to avoid rusting. 5. For high power transmission wires iron cables had to take the place of copper and it was found that these burn much quicker in cases of short circuit and accidents than do copper cables. Consequently more lightning arresters and protective fuses have to be used than is the case for copper. 6. For junction and cable boxes and manholes it is equally important to avoid all causes for electrolysis and to protect the iron cable against humidity to the fullest extent. To do this it is not sufficient to wind the conductors with the usual insulating tape, but a hermetically sealed joint must be used, often in the form of a soldered or cast joint at the junction of the two cables. 7. As the iron conductors are placed with a greater elasticity and greater sag than copper wires, allowance must be made for this in all calculations.

Comparative Cost of Iron and Copper Wires: Although the matter of cost does not play a very important part for Germany, for that country has to replace copper by substitutes no matter what the cost may be, it is not without interest to study the comparative costs of the old copper wires and the new iron, or zinc or iron and zinc alloy wires. It might even be that under certain conditions the substitue wires may prove more economical than the old copper ones. Owing to the great variety of different conditions under which these new metals now work, it is impossible to draw general conclusions as to the greater cost or greater economy of iron and copper wires. However, certain average costs are here given which allow conclusions on other costs.

Costs of an Installation for 150 ft. length, d. c. (7 KW).

	Copper (2 wires)	*Iron (2 cables)*
300 ft. of wire (copper) 10 sq. mm.	$10.00	.....
300 ft. cable (iron) 70 sq. mm.	.....	$11.00
6 insulators with setting	2.00	2.00
1 wooden pole (30 ft.)	6.25	6.25
Additional material	3.25	3.25
Setting pole	3.25	3.25
Stringing wires or cables	10.50	15.50
Total cost	$34.00	$39.00

The iron wire or cable system cost therefore from 15 to 20 per cent more than the copper, besides recalling that the electric effects are far inferior. Also, it must be remembered that this price for copper is very high, since copper at present in Germany has a price of $100 for 200 lb. or $50 per 100 lb.

The use of iron wire also becomes more burdensome, depending on the length of transmission lines, since the sections must be divided into a much larger number of individual cables than is the case with copper. In the following example we have a length of line of 300 ft. made up of an iron conductor of 140 sq. mm., constituted of two cables of 70 sq. mm. each. The costs are as follows:

Cost of Transmission Line of 300 ft. length (7 KW).

	Copper (2 wires)	*Iron (4 cables)*
630 ft. copper wire (16 sq. mm.)	$30.25	.....
1,260 ft. iron cable (70 sq. mm.)	.....	$43.50
8 insulators (copper) 16 insulators (iron)	2.50	5.00
2 poles (30 ft.) copper, 2 poles (40 ft.) iron	12.50	15.00
Auxiliary materials	1.00	2.00
Setting of poles	6.50	6.50
String of wires and detail work	21.00	63.00
Total costs	$63.75	$135.00

For overhead transmission lines, transmitting a. c. at 1,500 V., supposing that a copper wire of 16 sq. mm. cross section is equivalent to a corresponding iron wire of 120 sq. mm. cross section, the comparative costs per 6/10 mile would be for copper $687.25 and for iron $1,050. Under certain conditions, however, an iron line would show smaller costs and would give good results, as, for example, spans are short and no great electric charges are carried over the wires.

Zinc Conductors: Copper has also been displaced by zinc. The ordinary commercial zinc can be used for this purpose. It contains about ½ to 1 per cent lead, a little iron and cadmium, also traces of sulphur and antimony. The commercial zinc is sold in large plates that must be rolled into wire in the rolling mills, and has a crystalline structure. At present the zinc smelters are making experiments to see if the addition to the zinc of some metals like copper or antimony will not increase the usefulness of the zinc conductors for electrical purposes, a task which seems quite possible of fulfilling. After rolling and working, the zinc acquires a great flexibility which makes it very applicable to electrical work. A good zinc wire can be bent at right angles back and forth 20 times and more without breaking. The conductivity of the zinc wire is from 16 to 17 ohms per sq. mm., that of copper is between 65 and 70 per cent higher. But the principal question is whether the crystalline structure of the zinc particles will not work out to the detriment of the zinc wires. If the zinc wires will stand long service and offer strong resistance to rupture by traction and tension, zinc wire will be a success. But it may also be that these wires will not stand the strain of weather conditions and will have to be exchanged quickly, when they would of course be a failure. Time only can tell which view is the right one. Two points only are known at present: zinc cannot stand a high temperature beyond 130° and it resists tension stresses rather poorly.

As to the costs of copper and zinc wires, ordinarily the price is to the advantage of copper. Owing to the additional cost of refined zinc, the price of this type of zinc useful for electrical work is higher than for an equal weight or cross section of copper wire. From this standpoint, therefore, zinc is out of the question for longer spans. An attempt has been made, however, to combine zinc and iron for electrical wiring material, thus getting the good points of each. Zinc alone has a very poor resistance to tension stresses, but iron has a low electric conductivity and possesses unpleasant magnetic properties. On the other hand, iron has a good resistance to

tensile stresses and zinc offers a good degree of conductivity. In combining the two, the inner iron conductor receives an outer winding of zinc wire. The alternating current which passes the conductors will be absorbed by the zinc (the density of current being greater towards the periphery of the conductor than towards the interior). The great drawback to this type of wiring material lies in the fact that one cannot see the attack of rust on the iron wire until it is too late. On the other hand, winding the iron wire around the zinc core is also disadvantageous from the standpoint of electrical effect. It seems that this solution of the junction of the two metals for wire material is not a success.

Conclusions: The absolute necessity in Germany of substituting other metals for copper for every type of work except electrical work pertaining to the army is a proof of the desperate condition and the acute shortage of copper in Germany. And the truth of this shortage is assured, for this resumé was taken originally from an article written in *Annalen für Gewerbe* by a German engineer.—*Revue Générale de l'Electricité.*

Horn Gaps on Telephone Lines

To relieve the stresses on telephone lines paralleling its high-tension transmission lines a Southern company installs horn gaps between the communication circuits and ground at frequent intervals. With this construction numerous "safety valves" are offered to high-voltage surges which may be induced in the lines, so there will not be the tendency to break down insulators. Furthermore, damage to telephone equipment and hazard to persons using it are thus reduced. This additional equipment is relatively inexpensive as the towers are grounded anyway and the horn gaps are easily installed.—*Electrical World.*

Telegraph and Telephone

From the Saturday Evening Post.

Nearly four years ago Postmaster General Burleson submitted to congress a report recommending government ownership of telegraph and telephone systems. This report contained the following paragraph, which its authors apparently regarded as an important point:

"The United States alone of the leading nations has left to private enterprise the ownership and operation of the telegraph and telephone facilities."

The natural implication would be that the United States was behind other important nations. But, in fact, the United States at that time had developed under private ownership and operation a system of electrical communication as great as those of all Europe combined. Its systems not only carried a far greater number of messages than were transmitted by electrical means in any other country, but its charges to the public for this service were not out of line with the charges in other countries, when all the factors in the case were fairly weighed —such as higher wages here and the big annual deficit of the British postoffice telegraph, whose message rates were often compared with ours.

Other countries had public ownership. The United States had private ownership. In the extent and serviceableness of its system the United States was far in the lead. Rather naturally congress concluded that the plan on which the United States had beaten the world was not a bad one to stick to. Means of electrical communication in the United States are still privately owned. The recent act of congress which put them under government operation was a snap judgment taken under the exigencies of war. Good faith requires the government to manage them without prejudice to the plan of private ownership and operation—to which they should be restored the moment war ends.

Questionnaire Going Out

With the view of obtaining information to be used in determining the compensation to be paid telegraph and telephone companies while under government control, Postmaster General Burleson has decided on a questionnaire to be sent the companies, calling for statistics covering the period of the war.

Dividend Cheers Stockholders

Declaration of the regular quarterly dividend of 2 per cent on American Telephone and Telegraph, the first since government control, would seem to set at rest any thought of a lowering of the rate, as some timid shareholders have feared. President Vail says:

"Everything is as favorable as could possibly be expected, so far as negotiations have gone. There is evidently a firm determination to do absolute justice to the telephone security holders. There is no possible reason to anticipate anything unfavorable."

Talk from the Boss

Up in Canada there is a successful business concern that expects, as most successful concerns do, that every employe shall do his full duty. To assist in the task that concern places conspicuously before him these "10 Demandments":

1. Don't lie. It wastes my time and yours. I am sure to catch you in the end, and that is the wrong end.
2. Watch your work, not the clock. A long day's work makes a long day short; and a short day's work makes my face long.
3. Give me more than I expect, and I will give you more than you expect. I can afford to increase your pay if you increase my profits.
4. You owe so much to yourself you cannot afford to owe anybody else. Keep out of debt, or keep out of my shop.
5. Dishonesty is never an accident. Good men, like good women, never see temptation when they meet it.
6. Mind your own business, and in time you'll have a business of your own to mind.
7. Don't do anything here which hurts your self-respect. An employe who is willing to steal for me is willing to steal from me.
8. It is none of my business what you do at night. But if dissipation affects what you do the next day, and you do half as much as I demand, you'll last half as long as you hoped.
9. Don't tell me what I'd like to hear, but what I ought to hear. I don't want a valet to my vanity, but one for my dollars.
10. Don't kick if I kick. If you're worth while correcting you're worth while keeping. I don't waste time cutting specks out of rotten apples.

The young man in business—and no few of the old men as well—can get a good deal of profit from close perusal of these demands of the Canadian firm. A quiet self-examination of himself will develop in his own mind whether he is giving his employer all that employer has a right to expect. And it is a good deal easier for needed reprimands to be self-administered than to come from the "boss."—*Houston Post.*

Public Utility Commission News

Reports Concerning the Activities of State Regulating Bodies in the Telephone Field

Arizona

TELEPHONES in stores and other places of business in Phoenix will cost $5 per month in the future if the Mountain States Telephone and Telegraph Company for permission to raise rates is granted.

The application filed with the state corporation commission asks permission to "change and increase rates for business telephone service within the base rate area of Phoenix, Arizona." A like application was filed by the Mountain States company for permission to rase rates for business telephones in Tucson.

The present rate for "single line" business telephones in Phoenix is $4 per month. Besides asking permission of the corporation commission to raise the rate for single-line business telephones from $4 per month to $5 per month, the Mountain States Telephone and Telegraph Company also asks permission to establish a new form of service for two-party line business telephones at $4 per month.

Included with the application of the Mountain States company to the corporation commission are exhibits from the auditor's department which are said to show that for several months the telephone company, for the service mentioned in the application, has received barely enough to pay the expenses. The same situation is declared by the company to exist in Tucson.

California

The order of the Government taking over the telegraph and telephone lines of the country at midnight July 31 hastened consolidation activities in Los Angeles. Before noon an invoice had been taken of every possession of the two telephone companies, the toll stations were checked up and everything was in shape.

The state railroad commission handed down a decision authorizing the consolidation of the two local telephone companies. It is believed that the taking over of the lines by the Government will in no way hinder this, as Washington is desirous of centralizing all public utilities as much as possible.

The matter of rates for the city will be decided by the commission after the consolidation proceedings are all carried through.

T. A. Gould will take over the Pacific Telephone and Telegraph Company and combine it with the Home company.

The State Railroad Commission passed favorably on the application of T. A. Gould, president and general manager of the Redondo Home Telephone Company, for taking over the plant and property of the Pacific Telephone Company at Redondo Beach.

Colorado

Under the ruling of five judges of the state supreme court telephone users of Denver will be compelled to pay the increased rates granted recently by the utilities commission, at least until September 9, following the summer vacation. This was the announcement made following a conference at which counsel for the Mountain States Telephone and Telegraph Company and City Attorney James A. Marsh were present and at which time the supreme court was asked to hear the petition of city officials for a suspension of the increased rates pending the determination of jurisdiction. Judges Tully Scott and S. Harrison White were absent, but the other five members of the court decided that since the court is in recess, any one or all five had no authority to pass on the question, as the statute reads that the court shall adjudicate such matters.

Despite the fact that the supreme court refused to hear the petition, the city council at a special meeting passed an initiated ordinance fixing the schedule of rates which the Mountain States Telephone and Telegraph Company can legally charge, and fixing penalties. The passage of the ordinance represents the latest step on the part of the city to combat the increases ordered more than a month ago by the public utilities commission.

The schedule of rates as set forth by the new ordinance are practically the same as those charged by the telephone company befoer the increase was granted. The ordinance also provides that telephones shall be installed free of charge, and that one removal shall be made without charge. A penalty of not less than $100 or more than $300 is provided for violation of the rates fixed by the ordinance.

District of Columbia

With the taking of evidence in the telephone rate case completed, the Public Utilities Commission found itself in a position of doubt as to whether it or the postmaster general would render the verdict on the company's petition for financial relief.

The only certain element in the situation is the fact that the commission is in possession of extensive data as to increased costs incurred by the company since the war started, and the economies that would be effected through the installation of an automatic telephone system in the District.

This record is expected to serve as the principal guide for whatever action is taken with respect to telephones, but whether it will be turned over to the postmaster general or retained by the commission will be determined by events of the next few days.

The commission is studying the president's proclamation turning over the telephone system to the postmaster general, with the object of ascertaining to what extent its jurisdiction has been curtailed by this order.

If the government affords the necessary financial relief, the telephone company is willing to proceed at once with the installation of automatics in the District. T. P. Sylvan, assistant to the president of the company, so testified at the closing session before the commission.

According to a member of the commission, this statement is not regarded as inconsistent with the company's attitude heretofore concerning the automatic issue. In a letter to the commission last spring the company announced its willingness to proceed with the installation of automatics, but later withdrew the offer.

It is understood that the offer was made then and is renewed now on the condition of the necessary financial assistance being given the company.

Mr. Sylvan told the commission that the company is losing money more rapidly than was anticipated, and at a greater rate than that set forth in its petition for relief, last December. This petition still stands. It asks for a 10-cent rate for pay station calls and certain other increases. Mr. Sylvan said the company withdrew its application for elimination of the flat rate service.

Illinois

The Bell Telephone Company has absorbed the Automatic Telephone Company at Champaign. Previously the city contained two telephone exchanges. The consolidation was approved by the state utilities commission.

The receivers of the Central Union Telephone Company and the Macon County Telephone Company filed a petition for the approval of a sale by the former company to the latter of a telephone line two miles east of Forsythe to Argenta, and from Argenta to Cisco. The same companies ask the commission to approve a contract for the interchange of service at Bethany, Dalton City, Mt. Ziron, Warrensburg and other points served by the Macon company.

The Central Illinois Public Service Company and the Christian County Telephone Company ask the approval of an agreement for the joint use of telephone poles in Pana.

Indiana

The receivers for the Central Union Telephone Company have filed a petition with the state public service commission, setting forth in brief that the company has purchased the Kendallville Home Telephone Exchange and that the process of consolidating the two exchanges is now going on. The petition further gives the rates heretofore charged by the two local exchanges, setting forth the fact that such rates are "unreasonably low and inadequate and, if continued in effect after said plants are consolidated and the service unified at Kendallville, will continue to be unreasonably low and inadequate."

The petitioners therefore "apply for authority to place in effect and charge the following rates, tolls and charges from and after said consolidation and unification":

Business Service	
One-party line, unlimited, month	$ 3.50
Two-party line, unlimited, month	3.00
Extension, unlimited, month	1.00
Residence Service	
One-party line, unlimited, month	$ 2.00
Two-party line, unlimited, month	1.75
Four-party line, unlimited, month	1.50
Extension, month	.50
Rural, month	1.50
Private Branch Exchange	
Commercial, unlimited, month	$13.00
Includes switchboard (not exceeding 30 jacks), operators' set, 2 trunks and 3 stations.	
Additional trunks, unlimited	4.00
Additional stations, unlimited	1.00
Additional jacks (strips of 10)	.50

C. F. Wilsey, manager of the Corunna Telephone Exchange, received notice from the public service commission of Indiana, advising him that his petition for an increase in rates has been granted, and that the rates hereafter are to be as follows:

Independent business telephones, $1.50 per month.

Independent residence telephones, $1.25 per month.

Party residence telephones in town, $1.00 per month.

Rural party telephones, $1.25 per month.

All bills shall be due and payable on or before the tenth day of the month succeeding the month in which the service is rendered, and that a delinquency charge of 10 cents per month shall be paid by subscribers in the event bills are not paid on or before the tenth of the month.

The petitioner's physical property is of the estimated value of $13,000. It is a metallic circuit and in good condition. The management is also ordered to set aside 5 per cent of the physical value for depreciation.

The exchange has 247 telephones divided as follows: Twelve independent phones in town; 22 independent residence telephones in town; 15 two-party residence telephones in town; and 200 rural party telephones.

As the result of a recent hearing, held in the town hall at LaGrange, the Pretty Prairie Telephone Company has had its rates raised by the public service commission of Indiana. In its petition the company asked for a raise to twelve dollars a year from nine. But the commission, after hearing the facts involved, and an examination of the books, issued an order establishing the following schedule: Independent business telephone, $1.50; two-party business telephone, $1.25; independent residence telephone, $1.25; party line telphone, rural and town, $1.00; extension telephone, 50 cents; extension bells, 10 cents a month.

It is further ordered by the commission that the petitioning company shall set aside annually for depreciation five per cent of the value of all its physical property less lands, materials and supplies.

The public service commission has granted the petition of the Avilla Mutual Telephone Company for an increase in rates. The rate which was granted makes the cost of an independent residence telephone $1.25 and of an independent business telephone $1.50. The bills are payable and due the tenth day of the month succeeding the month in which the service is rendered. A delinquency charge of 15 cents per month per telephone is added to each of the above rates in the event subscribers do not pay their bills on or before the 10th day of the month.

Kansas

The North East Kansas Telephone Company has received permission from the public utilities commission to purchase the Home Telephone Company of Highland, owned and operated by L. F. Bender.

Michigan

The Moore and Valley Telephone Companies received notice from the state railroad commission to make physical connections according to negotiations which have been pending for some time. The order in substance is as follows:

That the two companies within thirty days construct and install facilities at Caro for complete interchange of local and toll line facilities without additional cost beyond the rates fixed in the order. The Caro rates are fixed as follows:

Kind of Service—	*Rate per Year* Net	Gross
Individual business	$28	$30
Party line business	20	22
Individual residence	17	19
Party line residence	14	16
(Not to exceed four parties on any one line.)		
Rural or farm line	17	19
(Not to exceed eight parties on any one line.)		

Rentals are to be billed quarterly in advance at the gross rate, which is subject to discount of 50 cents per quarter if paid on or before the 20th day of the first month of the quarter. Tolls to be collected monthly.

It is also ordered that the toll lines of the Moore System be connected with the Valley exchanges at Vassar, Mayville, Owendale, Gagetown and Reese, within thirty days, the Valley collecting and retaining 25 per cent.

Likewise the Moore becomes the agent of the Valley at Marlette for toll business.

The order fixes the net rates of the Valley at Sebewaing, $17 to $24; Vassar, same; Mayville, same; Unionville, same; Birch Run, Owendale, Gagetown, $15 to $21.

The expense of making connection at Caro is borne equally by the two companies. If the connection results in loss of subscribers to either party, the reduction of revenues resulting therefrom shall be borne equally by the two companies, any differences to be settled by the commission.

The Valley is required to put its lines and facilities at Unionville in standard condition before the new rates can become effective.

The lines and facilities of both companies included in the order shall at all times be kept in standard condition for reasonably efficient telephone service continually, and no present service shall be discontinued.

Physical connections between the Citizens Telephone Company and the Michigan State Company have been completed at Traverse City. This connection was ordered several years ago, but work was held up pending court proceedings to test the constitutionality of the law providing for physical connections. In its recent order the state railroad commission says:

"It is very evidently the apparent purpose and intent of the telephone law of the state of Michigan, to afford to the patrons of the telephone exchanges practically universal service and communication throughout the state. That would apply certainly to subscribers of telephone exchanges of reasonably standard construction and the commission is glad to encourage the connection of toll line facilities with local exchanges, in any case where it can be done without violation of the restrictions of the statute, and it might be stated it is the policy of the commission to apply this law, according to its evident and plain intent, keeping in mind, however, that this is not an opportune time in which to require or order the telephone companies to make extensive installations, because of the abnormally high expense of both labor and material."

Missouri

The Missouri Public Service Commission has made an order permitting the Kearney Telephone Company and the Holt Telephone Company, in Clay County, to increase their residence telephone rates from $1 to $1.50, and business telephones from $1.50 to $2, on condition they improve their service.

An opinion written by Commissioner David E. Blair and concurred in by all the members of the commission, grants an increase of rates to the Butler-Rich Hill Telephone Company of Butler conditioned on the company making improvements and betterments that will put its plant in first class shape. The schedule will not become effective until September 1, 1918. The principal change in the schedule is an increase of 75 cents per month for direct business telephones. The present rate is $1.75 per month. Another feature of the increase is the elimination of certain free service now rendered to Bates county exchanges. The commission refused the application for a 15-cent charge on certain toll business with county exchanges, but directed a schedule of rates for this business to be agreed upon and filed with the commission for approval.

New rates of the Southwestern Bell Telephone Company at Springfield which will go into effect September 1, were allowed August 2 by the public service commission of Missouri following the petition of the local company for increased rental rates.

The new rates as announced by the company follow: Business telephones, $3 to $4; straight line residence, $1.83 to $2.25; two-party lines, $1.50 to $1.75.

The commission ruled that there should be no more two-party business telephones. Mr. Seath said there were only a few of them in the city and that most of them had been getting single line service because it was impossible to connect them all up.

The Public Service Commission granted to the Southwestern Bell Telephone Company an increase of rates on toll calls sufficient to increase the revenues of the company's long-distance lines about 9 per cent. The new rates will become effective tomorrow. Local calls are not affected by the new schedule.

The increase was granted on evidence that the company's operating expenses during the past year have been nearly $400,000 more than the preceding year. According to William G. Busby, chairman of the commission, the increased revenues will be about one-fourth of the excess in operating expenses.

W. G. Barry, general commercial superintendent of the company, explained that the new rates would not greatly affect short-distance calls. Under the old system of computing toll rates, he said, the company has blocked off the entire state in sections fifteen miles square. The old rate for toll calls within the fifteen-mile radius was 15 cents.

Under the new plan the state has been divided into sections seven miles square instead of fifteen miles. The new rate for toll calls within the seven-mile radius will be 10 cents. Barry explained that the old toll rate to Webster Groves was 15 cents. The new rate is lowered to 10 cents. So, while the charge for calls beyond the seven-mile radius has been increased, the rate within the section has been decreased.

The new rate will be 10 cents for the first seven miles and 5 cents for each additional seven miles or fraction thereof, the longer calls being affected most by the increased rate.

While special rates between certain points, such as St. Louis and Jefferson City, have been granted in the past, the new plan is to standardize all rates and cancel all special rates. Under this plan an increase of about 33 per cent will be charged for calls between St. Louis and Jefferson City, the old rate being 70 cents and the new rate 95 cents.

Nebraska

Five hundred stockholders of the Hamilton County Farmers' Telephone Association held a mass convention at Aurora and denounced the action of the state railway commission in enjoining the building of a farm line north from Hampton, Neb. The order was granted by the commission upon the application of the Lincoln Telephone Company without notice to the farmers' company. At the meeting impassioned speeches were made denouncing the tactics of the big telephone company in forcing the cooperative concerns out of business and then absorbing their territory. The resolutions adopted by the big convention direct the board of directors of the farmers' company to fight the case to the last ditch. The opinion was expressed that the Lincoln company's desire to acquire the Hampton territory would shortly be followed by its acquisition of Aurora and all of the county.

The two telephone companies are now fighting in the district court and state railway commission. The court has restrained the severing of toll lines at Aurora. The Lincoln company has asked the railway commission for permission to cut Aurora off from long distance service routing.

The order of the commission referred to is one made on the Lincoln company's motion, which forbids the Hamilton county company to take over or furnish service to anyone who is now or has recently been a subscriber on the Lincoln company's competing exchange at Hampton. This is denounced by the Hamilton county company as an unwarranted interference with its business and an unlawful attempt to prevent competition.

In its motion to dissolve the commission's order prohibiting it from taking over the subscribers of the Lincoln corporation, the Hamilton county company alleges:

1. That the commission has no power or authority to make such an order.
2. That it is an illegal attempt to repeal and annul the law of competition, the state legislature having three times refused to enact a law giving the commission such authority.
3. That it attempted to create an absolute and exclusive monopoly in the telephone business.
4. "The commission by its said order has violated the purpose of the Junkin anti-trust act and other acts passed to encourage competition and destroy monopoly."
5. That it deprives the Hamilton county company of the right to continue its business "but does not restrain the powerful and monopolistic Lincoln Telephone & Telegraph Company from proceeding with its announced purpose of destroying the Hamilton county association or forcing its sale or transfer to said Lincoln company."

6. That it is an unlawful attempt to oust the district court of Hamilton county of its jurisdiction previously acquired, wherein the Lincoln company applied for and was refused an injunction to prevent the Hamilton county company from constructing its lines.

New York

The public service commission, second district, at its regular session, Chairman Charles B. Hill presiding, authorized the Glen Telephone Company to issue $100,000 common stock. The proceeds of the sale of stock are to be used to discharge six per cent promissory notes amounting to $84,000; to reimburse the treasury for moneys expended from income for the acquisition of fixed assets from December 31, 1912, to June 30, 1917, $10,828.74, and to discharge accounts payable, $5,171.26. The company operates in Montgomery and Fulton counties.

Minnesota

The Granite Falls Telephone Company is permitted to place in effect, as of October 1, 1918, the following schedule of exchange rates for local telephone service at Granite Falls, Minnesota:

Individual line business, per month gross	$2.75
Business extension, per month net	.50
Individual line residence, per month gross	1.75
Two-party line residence, per month gross	1.50
Four-party line residence, per month gross	1.25
Residence extension, per month net	.05
Rural multi-party (company owned), per month gross	1.75
Extension bells, per month net	.25

gross.

Extension bells, 25 cents per month, net.

A discount of 25 cents per month will be allowed from the above gross if the bill is paid on or before the 10th of the month following that in which the service is rendered.

The Home Telephone Company of Grand Meadows is permitted to place in effect the following schedule of rates:

Individual line business, per month gross	$1.60
Two-party line business, per month gross	1.35
Individual line residence, per month gross	1.35
Two-party line residence, per month gross	1.10
Rural multi-party, per month gross	1.10

A discount of 10 cents per month to be allowed on residence and business telephones within the village if the bill is paid on or before the last day of the month following that in which the service is rendered, and a discount of 10 cents per month will be allowed on rural telephones, if paid on or before the last day of the quarter in which the service is rendered.

In the matter of the application of Charles Gomer et al., for the interchange of messages between the Interstate Telephone & Telegraph Company and the Brownsdale Telephone Exchange Company, the commission finds that the Interstate Telegraph & Telephone Company is operating a telephone exchange in the city of Austin, Minnesota, with rural lines extending into the township of Red Rock and surrounding townships; that the petitioners named in the foregoing matter are subscribers to the Interstate Telegraph & Telephone Company residing in the rural districts:

That the Brownsdale Telephone Exchange Company operates a telephone exchange plant at Brownsdale, Minnesota, some eight miles northeast of the village of Austin, with rural lines extending southwest and serving subscribers resident adjacent to subscribers to the Interstate Telegraph & Telephone Company's rural lines:

That certain subscribers of the Brownsdale Telephone Exchange Company and certain subscribers of the Interstate Telegraph & Telephone Company are neighbors, residing in the town of Red Rock; that the application seeks to have the service of the Interstate Telegraph & Telephone Company and the Brownsdale Telephone Exchange Company combined for those subscribers of the respective companies that are resident along this border territory, and that a flat rate be established in addition to the regular rental for this combined service.

The Commission has made an extended investigation of the facts and conditions surrounding these subscribers, and is unable to establish a zone system that will give to the petitioners the service asked for without discriminating against other subscribers to either of the respective telephone companies; or, if the service is extended to all subscribers, without placing an unreasonable financial burden upon the telephone companies.

At the present time there is a toll rate in effect between the exchanges of 10 cents per message, which enables the subscribers and petitioners in this matter to reach by telephone the subscribers to the other telephone system.

Therefore it is ordered that the application of the petitioners for a flat rate for interchange messages between the Interstate Telegraph & Telephone Company and the Brownsdale Telephone Exchange Company be denied.

In the matter of the application of Andrew Davis for indeterminate permit to construct and operate a telephone line in the village of Elk River, Minnesota, the Commission finds that in the village of Elk River the Northwestern Telephone Exchange Company is furnishing local exchange service to the satisfaction of the public, and that there is no public demand and no public convenience to be satisfied, requiring the issuance of an indeterminate permit for the operation of an additional local exchange in Elk River; that the petitioner, from the evidence introduced, is merely seeking to extend a toll line from his place of business to connect with the Sherburne County Rural Telephone system. This purpose can be carried out and arranged for by the petitioner and the Sherburne County Rural Telephone system by the construction of toll lines from one of the exchanges of the Sherburne County Rural Telephone system to the village of Elk River, and the establishing of a toll office in said village of Elk River by the Sherburne County Rural Telephone system.

The Commission has no jurisdiction to grant a permit to the petitioner for the construction of such toll line, and that there is no limitation in the laws of the State of Minnesota restraining said petitioner or said Sherburne County Rural Telephone system from constructing said line if they so deem it advisable. Therefore it is ordered that the petition be dismissed.

In the matter of the application of the Swift County Telephone Company for authority to increase its rates for local exchange service at Benson, Minnesota:

Whereas, on the 2nd day of August, A. D. 1918, the Commission issued its order in the above entitled matter authorizing a certain increase in telephone rates to said petitioner, and

Whereas, the Commission upon checking the records of said case finds that a clerical error was made and that the order does not comply with the petition and the intention of the Commission,

Therefore, it is ordered, that the order of August 2nd, A. D. 1918, be amended to read as follows:

"It is therefore ordered that the Swift County Telephone Company be, and the same is hereby permitted to place in effect as of September 1, 1918, the following schedule of rates for local telephone service at Benson, Minnesota:

Individual line business, per month gross	$2.75
Two-party line business, per month gross	2.25
Individual line residence, per month gross	1.75
Two-party line residence, per month gross	1.50
Four-party line residence, per month gross	1.25
Rural multi-party, per month gross	1.50
Business extension, per month net	.50
Residence extension, per month net	.50
Extension bells, per year	2.00

"All rates to be billed gross except where quoted net. All gross rates to be payable monthly in advance, with a discount of 25 cents per month if paid on or before the 15th of the month in which the service is rendered, except that multi-party rural rates are payable quarterly in advance, with a discount of 75 cents if paid on or before the 15th of the first month of the quarter, a discount of 50 cents if paid on or before the 15th of the second month of the quarter, and a discount of 25 cents if paid on or before the 15th of the third month of the quarter."

In the matter of the application of the Pine Island Telephone Company for authority to increase its exchange rates at Pine Island, Minnesota:

Whereas, The foregoing entitled matter came on before the Commission at hearing held the 14th day of January, 1918, in the village of Pine Island, State of Minnesota; and

Whereas, The petitioner filed an appraisal of its properties, showing the cost of reproduction new $27,031.74, and present value $19,345.28; and

Whereas, Thereafter the Commission, through its engineer, has inventoried and appraised the said properties, who has reported to this Commission his appraisal showing the cost of reproduction new $20,798.55 and present value $12,940.80; and

Whereas, The determination of the valuation of said properties is an essential element in the final determination of said petition;

Therefore, it is ordered, that the Pine Island Telephone Company show cause on the 16th day of September, 1918, at 2:00 p. m., at the office of the Commission in the State Capitol, St. Paul, Minnesota, why the inventory and valuation filed in said matter by the engineer of said Commission should not be accepted by said Commission as the true value of said properties.

The New Richland Telephone Company is authorized to place in effect as of September 1, 1918, the following rate schedules for New Richmond and Waldorf, Minnesota:

New Richland—

Individual line business (desk), per month net	$2.00
Individual line business (wall), per month net	1.75
Individual line residence (desk), per month net	1.25
Individual line residence (wall), per month net	1.00
Multi-party rural, per annum gross	16.00

The multi-party rural rate to be subject to a discount of $2.00 per year if paid six months in advance.

Waldorf—

Individual line business, per month net	$ 1.75
Individual line residence, per month net	1.00
Multi-party rural, per annum gross	16.00

The multi-party rural rate is subject to a discount of $2.00 per annum if paid six months in advance.

The Tri-State Telephone & Telegraph Company is permitted to place in effect, as of September 1, 1918, the following schedule of rates for local telephone service at Tracy, Minnesota:

Individual line business, per month gross	$2.75
Two-party line residence, per month gross	1.50
Individual line residence, per month gross	1.75
Two-party line residence, per month gross	1.50

A discount of 25 cents per month to be allowed if the bill is paid on or before the 15th of the month in which the service is rendered.

The Deer Creek Telephone Company is authorized to place into effect, as of September 1, 1918, the following schedule of rates for local exchange service at Deer Creek, Minnesota:

Individual line business, per month gross	$2.00
Individual line residence, per month gross	1.75
Two-party line residence, per month gross	1.50
Multi-party rural, per month gross	1.50
Extension telephones, per month net	.75

All gross rates to be payable monthly in advance with a discount of 25 cents per month if paid on or before the 15th of the month in which the service is rendered, except that multi-party rural rates are payable quarterly with a discount of 75 cents if paid on or before the 15th of the first month of the quarter; a discount of 50 cents if paid on or before the 15th of the second month of the quarter; and a discount of 25 cents if paid on or before the 15th of the third month of the quarter.

The Swift County Telephone Company is permitted to place into effect, as of September 1, 1918, the following schedule of rates for local telephone service at Benson, Minnesota:

Individual line business, per month gross	$2.75
Two-party line business, per month gross	2.25
Individual line residence, per month gross	1.75
Four-party line residence, per month gross	1.50
Rural multi-party, per month gross	1.50
Business extension, per month net	.50
Residence extension, per month net	.50
Extension bells, per year net	2.00

All rates to be billed gross except where quoted net. All gross rates to be payable monthly in advance, with a discount of 25 cents per month if paid on or before the 15th of the month in which the service is rendered, except that multi-party rural rates are payable quarterly in advance, with a discount of 75 cents if paid on or before the 15th of the first month of the quarter; a discount of 50 cents if paid on or before the 15th of the second month of the quarter; and a discount of 25 cents if paid on or before the 15th of the third month of the quarter.

The People's Telephone Company is permitted to place in effect, as of September 1, 1918, the following schedule of rates for local telephone service at its exchanges located at Chatfield, Racine, St. Charles, Spring Valley and Stewartville:

Individual line business, per month gross	$2.50
Two-party line business, per month gross	2.25
Individual line residence, per month gross	1.50
Four-party line residence, per month gross	1.25
Lodges and clubs, per month gross	1.50
Multi-party rural, per month gross	1.50

A discount of 25 cents per month to be allowed if the bill is paid on or before the 15th of the month in which the service is rendered. Except that multi-party rural rates are payable quarterly in advance, a discount of 75 cents to be allowed if paid on or before the 15th of the first month of the quarter; a discount of 50 cents if paid on or before the 15th of the second month of the quarter; and a discount of 25 cents if paid on or before the 15th of the third month of the quarter.

It is further ordered that subscribers at Racine be given the choice of service to either Stewartville or Spring Valley.

The Northwestern Telephone Exchange Company is permitted to place in effect, as of September 1, 1918, the following schedule of rates for local exchange service at Glenwood, Minnesota:

Individual line business, per month gross	$2.75
Two-party line business, per month gross	2.50
Individual line residence, per month gross	1.75
Two-party line residence, per month gross	1.50
Four-party line residence, per month gross	1.25

A discount of 25 cents per month is to be allowed from the above rates if the bill is paid on or before the 15th of the month in which the service is rendered.

The Northwestern Telephone Exchange Company is permitted to place into effect, as of September 1, 1918, the following schedule of exchange rates for local telephone service at Wadena, Minnesota:

Individual line business, per month gross	$2.75
Two-party line business, per month gross	2.50
Individual line residence, per month gross	1.75
Two-party line residence, per month gross	1.50
Four-party line residence, per month gross	1.25

A discount of 25 cents per month will be allowed on the above rates if payment is made on or before the 15th of the month in which the service is rendered.

The Town & Country Telephone Company is authorized to purchase from the Canby Telephone Company all of its physical telephone properties; also that all rural and toll line connections now existing with the Canby Telephone Company shall be maintained by the Town & Country Telephone Company.

* * *

Oregon

The Canby Co-operative Telephone Association is authorized to discontinue its present rates, charges and practices for telephone service in so far as they conflict with those determined to be reasonable, and in lieu thereof to substitute the rates, charges and practices found to be just, reasonable and not unjustly discriminatory.

Just, reasonable and not unjustly discriminatory rates for the Canby Co-operative Telephone Association to impose for its service are found to be as follows:

	Business	*Residence*
Individual line	$2.50	$1.75
Two-party line	2.00	1.50
Four-party line	1.75	1.25
More than four parties	1.50	1.00

In the matter of the application of Mrs. Lucy Samler (J. G. Samler Estate) for authority to increase rates, the applicant requests that it be permitted to increase its switching rates from three dollars per year to five dollars per year, claiming that the revenue derived from its existing rates is insufficient to meet its operating expenses and fixed charges and pay a reasonable return on the capital invested.

This utility now furnishes switching service to 137 subscribers in the town of Yoncalla, and the surrounding communities, 136 of whom pay a switching rate of $3 per year, which produces an annual income of $408. Applicant also furnishes switching service to the Southern Pacific Company at its depot in Yoncalla under a special contract, for which it receives a compensation of $12 per year. In addition to its revenue from switching service the applicant receives in commissions on toll business handled by it approximately $3 per month or $36 annually. This produces a total annual revenue from all sources of $456. This amounts to approximately $1.25 per day, which is insufficient to pay the salary of the operators, to say nothing of

other operating expenses, maintenance, depreciation or interest on the investment.

This utility furnishes fourteen-hour service, and at the present minimum wage scale fixed by the Industrial Welfare Commission the salary of women operators would be $19.80 per week, or $2.83 per day.

From a full consideration of the entire record before it, the Commission finds that the present switching rates of the applicant are unjust, unreasonable and unjustly discriminatory.

It appears that under the five dollar switching rate applied for the revenues of the utility would, under present circumstances, be increased to $728 per year. This revenue is not more than sufficient to meet the operating expenses, maintenance, depreciation and interest on the investment, nor is the rate excessive for the service rendered, and such rate is hereby found to be just, reasonable and not unjustly discriminatory to be charged by the applicant in the future.

In addition to the equipment used by this utility in the furnishing of switching service, it owns about eighteen telephone instruments, which instruments have been rented to various parties obtaining switching service through its board. In the past the utility has been charging $2.00 per year for the use of these phones. From the record it would appear to be the company's intention to cease to make this charge. While in this case the Commission has considered this transaction as a mere rental of telephone equipment and not as a part of its utility service, it would recommend and urge that in fairness to the utility and to its patrons some charge should be made for the use of this equipment.

Based upon the foregoing findings, and upon all the testimony and evidence received, it is ordered that the applicant be granted the right to charge the just, reasonable and not unjustly discriminatory rates hereinbefore set forth.

North Carolina

The corporation commission has dismissed the petition of the Southern Bell Telephone and Telegraph Company for increased rates for 12 of the North Carolina exchanges, including Charlotte, Raleigh, Wilmington, Asheville, Winston-Salem, Greensboro, Hendersonville, the dismissal being on the ground that the government being about to take over lines, the issue of increasing the rates is no longer a question on which the commission is called upon to act.

Chairman Travis had prepared the order allowing the increased rates, and it was to have been signed by two of the commissioners. The third, Judge Pell, assumed the attitude of opposition on the ground that the counsel for the opposition should have been granted their prayer for more time in which to verify figures submitted by the telephone company and examine the books of the company. However, President Wilson having issued his order for the telephone lines to be taken over along with telegraph lines, it was decided to dismiss the petition and leave the rate adjustment wholly with the Federal authorities.

Ohio

Radical changes in the conduct of telephone service in Mansfield is forecasted in the application filed today with the state utilities commission, at Columbus, by the Mansfield Telephone Company for permission to purchase the Mansfield holdings of the Bell Telephone Company. The commission has ordered that inventories of both properties be filed with it at once.

Until the merger of the two interests is permitted it will be impossible for the Mansfield company to assume the active management of the Bell interests. That plans have been made on a big scale for activity that is to start as quickly as the sale is allowed was admitted, however, by officials of the purchasing company.

The tentative plans thus far made call for a complete remodeling and modernizing of the home of the Mansfield company, and the location of both properties in that building. The change, however, cannot be made at once and it will be necessary to operate the Bell exchange for a time at its present location.

The Ohio State Telephone Company has carried its fight to boost rates in Columbus to the supreme court. The company asks for a reversal of the holding of the state public utilities commission that local rates could not be increased until after an application for this had been granted by the commission. In 1914 the commission fixed the rates to be charged by the company in Columbus and in February, 1917, the company filed a new schedule of rates providing for an advance which it contends automatically went into effect within 30 days because no objection was lodged against it by patrons. The commission ruled that as it had once fixed the rates, they could not be changed unless an order for this was issued. This ruling was given several weeks ago. The company had been charging patrons the higher rates for more than a year when the commission made its finding, in which it was held that patrons were entitled to a refund for all that they had paid in excess of the 1914 rate. The decision of the supreme court will determine whether the increased rates were valid. If the commission is sustained it will be incumbent upon the company to make refunds, and to make formal applications to the commission for authority to increase rates before there can be any change.

The state public utilities commission has authorized the Ohio State Telephone Company to purchase the Citizens Telephone Company, Berea; the Portage County Telephone Company, Ravenna, and the Nelsonville & Murray Home Telephone Company, Nelsonville. The company will pay approximately $170,000 for the three properties.

Oklahoma

Following adjournment of the hearing on the application for higher rates in Oklahoma City before the corporation commission, the Southwestern Bell Telephone Company submitted to the commission a detailed schedule of the increases for various classes of service, which the company regards as necessary to overcome the increased cost of operating expenses.

Under the schedule offered by the company, a flat rate and measured rate would be put into effect on all business and residence telephones, the flat rate on individual business line telephones going to $6.50 a month, and the measured rate on this class of service $4, based on a maximum of eighty outgoing calls a month, with an extra charge of 3 cents a call for each call above eighty.

The flat rate on individual residence phones would be raised to $3 a month, and the flat rate on two-party line residence $2.75. The measured service rate on residence, it is proposed, should be $2 with sixty calls the limit, and an extra charge of two cents for the additional calls.

These rates would apply according to zones measured from the office of the telephone company at Third street and Broadway.

Individual and party line rates apply to telephones within one mile, air line, of Third street and Broadway. For telephones located within exchange area, more than one mile, air line, from Third street and Broadway, a charge of 25 cents for each additional one-half mile, air line, or fraction, shall be made and a charge of 15 cents for each additional one-half mile air line or fraction thereof for party line.

Wisconsin

The Woodhull Telephone Company has applied to the Railroad Commission of Wisconsin for permission to increase its rate from $15 to $18 a year.

The company in its petition recites that it's capitalized at $25,000 and that it has never been able to set aside anything for depreciation; that the plant is now eleven years

old, and needs rebuilding, and that money is necessary for this work.

"We have paid a ten per cent dividend each year," recites the petition. "We have forty miles of pole line, all cedar poles. We have 143 miles of 12 iron wire, all metallic circuits.

"We have 161 subscribers, all receiving unlimited service at the Fond du Lac exchange of the Wisconsin Telephone Company, for which we pay a switching charge of $5.00 per year per subscriber. We have no exchange of our own.

"Our annual rate is $15.00, thus leaving $10 per year for our gross revenue, while all other companies operating in this vicinity with a similar service are charging $18.00 per year.

"With the rebuilding and rearranging of our lines it is planned to have not more than ten on any circuit.

"Within the past thirty days there has been an exact inventory made of the line and this can be furnished in detail if desired."

Compensation of Engineers

"What is the matter with a college education?" is a question asked by M. J. Henoch of Sioux City, Iowa, when he quotes the following two advertisements which appeared in the *Engineering News Record*:

"A college graduate in electrical engineering wanted with one or two years' experience for work along technical lines in a permanent position on telephone-office equipment in Buffalo, N. Y. Will pay $16 per week for man with one year's experience and $18 per week for man with two years' experience. Address communications to Telephone Company, 297 Michigan St., Buffalo, N. Y."

"AT ONCE, experienced pile driver wanted and dock builder foreman for Government job, Philadelphia; average wages $60 per week; write, giving experience in detail and earliest date of starting. P454 Eng. News-Record, Philadelphia."

In answer to this question, Henry F. Romaine, formerly general manager for the International Construction Company of Duluth, but now with Edmund T. Perkins Engineering Company, advances the suggestion that the nail has been struck on the head.

Why is it that a man, a graduate of an engineering college, with two years of experience, the total figuring quite a financial outlay, has a position offered him at a disgracefully paltry salary of $18 per week, while along beside him appears a man with practically no education whatever who is offered $60 per week, with the probabilities that the advertiser was not deluged with applications?

Suppose that this electrical engineer, instead of spending four years or more of study requiring a considerable outlay of capital and two years of experience, had started in as an assistant foreman or assistant superintendent in some trade as pile driving for instance, he would soon have been approached and practically *forced* to join some association for mutual benefit. Then once in a while the association would meet and decide, among other questions of interest, what they considered a fair minimum working wage, and no one would work under the wages decided upon. Therefore it would be up to the owner to pay instead of the easy-going engineer, who is usually afraid to stand up for his rights and feels that there is another engineer ready to take his place at his meager wage, working for some one, and in fact paying for the privilege of working. The main trouble is that there is no *co-operation* among the engineering profession; each appears to be for himself alone.—*The Nomad.*

The Live Wire Era

By F. H. BOGART, in *Industrial Management*

A good deal of the present-day demand for the "live wire" to fill executive positions in our manufacturing industries is based on the mistaken idea that human dynamic force can of itself be made an effectual substitute for either business or mechanical experience and foresight. Men of this type accomplish results—of a certain character—and, fortunately for themselves, accomplish them at just that period in the development of any new undertaking when the men higher up are the most anxious to get action and the most impatient if expected results are not forthcoming. Their method, moreover, will be making a showing when the business or mechanical analyst would be engaged in a detailed study of the basic faults of organization or equipment—a study that is absolutely essential as a groundwork for the method this type of executive must follow to secure what, in his own estimation would constitute a satisfactory result. Work of this character is entirely devoid of fireworks, and during its progress it is practically impossible to make any improvement in conditions that will be apparent above the surface, because to dabble in petty reforms would only complicate and delay the task of constructing a consistent and common sense organization or production plan from the foundation which the analytical work is to disclose. Men of this type are consequently at the start under the handicap of their own method, and, because they seem to be plodding along without result at a time when an over-anxious official may be expecting spectacular improvements in conditions, they are subject to proddings and criticism that reduce their efficiency and that operate to the disadvantage not only of the individual but of the type, and indirectly boost the prestige of the "live wire" whose quickly-achieved results create a more favorable impression.

It is not my purpose at all by the above to discredit the "live wire" or to even suggest that physical energy and an alert mind are not splendid assets in the accomplishment of any organization or mechanical task. The point I am driving at is that just at the present time many people seem to think that an abundance of "push" is all that is needed to put through an undertaking in the line of creating a business or perfecting mechanical production, while I contend that in the long run the prime essential is experience. Backed by practical experience in the same or similar lines of work, a surplus of physical energy and the ability to hold the keen edge of one's intellect through a long day's work is the finest asset imaginable. Mere executive aggressiveness, on the other hand, not based upon practical experience, in nine cases out of ten becomes a whip on the backs of the subordinates who may have that experience, growing constantly more irritating as greater pressure is brought to bear, until the whole organization is in a state of nerve tension incompatible with good work and reduced to but a small fraction of its normal efficiency.

An Opportunity

TELEPHONE ENGINEER:—Enclosed check for $1.00, payment one year's subscription. If you have in mind an active young gentleman, who is anxious to engage in a growing and prosperous telephone plant in Taos county, New Mexico, kindly place me in touch with him. Either want to engage more capital or sell portion or entire plant. Prefer first. P. V. DIECKMAN, President and Manager, Taos Telephone Co., Taos, New Mexico.

Telephone Patents Recently Issued

A Brief Digest of those Current Specifications Most Interesting to Telephone Men

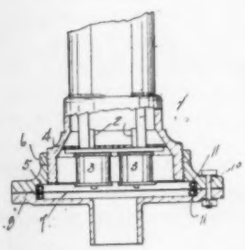
BY DAVID S. HULFISH

NO. 1,260,412. Automatic Exchange System. Issued to A. E. Lundell, assignor to Western Electric Company, Inc., New York, N. Y. The selector banks are not arranged in simple ten-by-ten banks, and intermediate control between the call sender and the selector permits proper selection to be made to take up the desired line number.

1,260,424. Automatic Exchange Signal System. Issued to T. G. Martin, assignor to Automatic Electric Company, Chicago, Ill. (Application filed July 12, 1909.) An application disclosing an arrangement whereby the signal relay at the first switch receives all the signals from the call sender and repeats the impulses to the trunks leading to the further selecting switches.

1,260,971. Linefinder System. Issued to A. H. Dyson, assignor to Kellogg Switchboard and Supply Company, Chicago, Ill. (Application filed November 13, 1906.) The claims pertain to arrangements of line relays by groups and subgroups arranged to identify the calling line, and to test circuits for enabling the linefinder switches to select the line calling according to the grouping of lines.

1,261,391. Receiver Diaphragm. Issued to Fred Hoyt, Seattle, Washington, assigned to Universal High Power Telephone Company. The diaphragm is held between two rubber rings. The rings are clamped between the cap and the receiver shell and the diaphragm is clamped between the rings.



1,261,391

1,262,112 and 1,262,113. Cord Circuits. Issued to F. M. Slough, assignor to Stromberg Carlson Telephone Manufacturing Company, Rochester, N. Y. Upon working the telephone hook to recall the operator, the talking conductors of the cordpair are cut by relays and the called line is released, the calling line remaining busy by test.

1,262,315. Linefinder System. Issued to B. G. Dunham, assignor to Western Electric Company, Inc., New York. N. Y. The calling line is identified by shunting the resistance of the cut-off relay, the line relay closing the shunt circuit and the test being made upon the test wire.

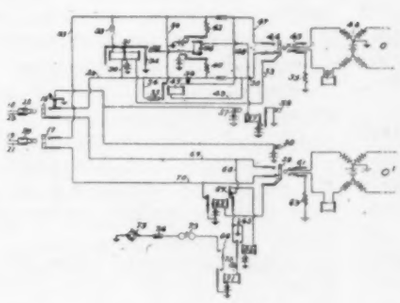
1,262,323. Linefinder System. Issued to C. L. Goodrum, assignor to Western Electric Company, Inc., New York, N. Y. In an exchange of mixed manual lines and automatic lines, linefinders are arranged to pick up a calling line and to extend manual lines to an operator and to extend automatic lines to automatic selectors.

1,262,639. Callsender Circuit. Issued to H. P. Clausen, assignor to Western Electric Company, Inc., New York, N. Y. Pulling the dial of an automatic telephone closes the line loop when the receiver has not been lifted from the hook.

1,262,752. Linefinder Mechanism. Issued to H. P. Clausen, assignor to Western Electric Company, Inc., New York, N. Y. Lifting the receiver upon a line charges the line relay and the relay then is held mechanically until the line has been picked up by a linefinder.

1,263,010. Semi-Automatic System. Issued to B. D. Willis, assignor to Automatic Electric Company, Chicago, Ill. A trunk may be picked up by an automatic telephone and has available a manual jack and signal as well as an automatic switch. The calling telephone may operate the automatic switch without operating the manual signal, or vice versa.

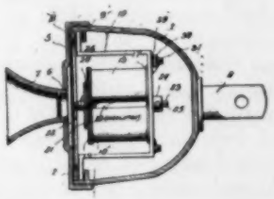
1,263,013. Meter System. Issued by G. A. Yanochowski, assignor to Automatic Electric Company, Chicago, Ill. Each line has a time-meter and each connector has a time-meter, with circuits to operate them, so that the total time of use of any line and the total time of use of any connector may be read at intervals.



1,263,083

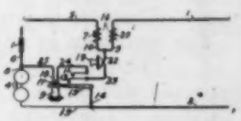
1,263,083. Trouble System. Issued to A. E. Lundell, assignor to Western Electric Company, Inc., New York, N. Y. A special circuit is arranged when a line is out of service to divert calls upon that line to an information jack, a signal at that jack being arranged under control of the wire chief to glow in case the line is in condition to be restored to ordinary service.

1,263,140. Transmitter. Issued to Lonnie Burnett Stone, Louisville, Ky. The carbon is arranged in several spool-like chambers, with a pressure-distributing button engaging the diaphragm at its center and engaging the carbon cells at the ends of its radial arms.



1,263,140

1,263,376. Party-Line Trunking System. Issued to H. P. Clausen and C. L. Goodrum, assignors to Western Electric Company, Inc., New York, N. Y. A trunk to a distant B-board has a jack for each party-line station number in the exchange, and automatic switches operate to connect to the plug at the B-board a ringing generator corresponding to the number of the jack by which the trunk is connected at the A-board, thereby providing automatically for proper ringing current for party line service.



1,263,421

1,263,421. Substation Circuit. Issued to K. S. Johnson, assignor to Western Electric Company, Inc., New York, N. Y. In the usual common battery substation circuit, the location of the ringer is changed.

Reissue 14,462. Automatic Telephone System. Issued to T. G. Martin, assignor to Automatic Electric Company, Chicago, Ill. Original No. 1,176,715, dated March 21, 1916. The patent covers arrangements of signals for sub-exchanges using the Keith line switch unit, and provides for releasing any desired switch from the central office.

1,264,137. Meter System. Issued to A. Anderson, assignor to Automatic Electric Company, Chicago, Ill. Provision is made in an automatic exchange for operating the meter of the called line.

1,264,158. Calling System. Issued to H. P. Clausen, assignor to Western Electric Company, Inc., New York, N. Y. In the final connector, two lines may be called independently by calling the number of either; but, by calling another determined number, a connection may be had with both of the lines at the same time.

1,264,366. Callsender. Issued to H. P. Clausen, assignor to Western Electric Company, Inc., New York, N. Y. In a calling device, the dial figures are hidden while the dial is returning to normal position.

1,264,388. Searching System. Issued to O. D. M. Guthe, assignor to Western Electric Company, Inc., New York, N. Y. The selector brushes move back and forth over the contacts of the bank, searching both ways until an idle trunk is found.

1,264,507. Transmitter. Issued to W. W. Hanscom, assignor to National Radio Company, San Francisco, Cal. The transmitter has a plurality of carbon cells, and a cooling fluid circulates through the transmitter case.

1,264,517. Callsender. Issued to H. J. Herink, assignor to The Relay Automatic Telephone Company, Ltd., London, England. When a number key is depressed, corresponding relays are charged and locked, and those relays result in sending a series of impulses to the automatic switches.

1,264,813. Current Amplifier. Issued to A. J. Kloneck, New York, N. Y. Two dynamo-electric machines are used, with revolving armatures, with double-wound fields and interconnections between the fields and armatures, and through these devices the telephone speech currents are led, for amplification by mechanical energy.

1,264,826. Automatic Switch. Issued to F. A. Lundquist, assignor to Casper L. Redfield, trustee, Chicago, Ill. The brushes drop by gravity, until a stop is engaged, which completes circuit and removes that stop from the path of other falling brushes.

Government Worries Investors

The need of a great national association of investors to protect the profits of its members was never more clearly shown than by the present situation in which the government has taken control of the telephone and telegraph systems. "Just compensation" has been promised in general terms, but stockholders, mindful of the unpleasant experience of the railroad companies under similar conditions, are worried, and not a few have been selling their holdings, thus depressing the market.

The only bulwark that has prevented the signing of a contract most objectionable to holders of railway stocks and bonds was the association of railway security owners. There is no association of telephone and telegraph security owners and if there were it would not represent enough people to carry very great weight. The Bell Telephone Company has about 130,000 owners of stock and there may be bondholders enough to bring the number up to 150,000. More than half the stockholders are women and the great majority own only a few shares. The number of holders of telegraph stock probably is much smaller. The company is unwilling to make public the figure.

There are, all told, probably from 140,000 to 160,000 people who have invested their savings in these two companies. They have been told officially that "regular dividends heretofore declared and maturing interest on bonds, debentures and other obligations may be paid in due course unless otherwise ordered by the postmaster general." Such an uncertain assurance that their incomes will continue, naturally is depressing. If they had the backing of an association, representing not only themselves but a few million other people whose property may be taken similarly next week or next month, their position would be stronger.

Flat Rate Chicago Issue

The Chicago Telephone Company, through Bernard E. Sunny, president, appealed to the city August 21 to authorize the discontinuance of the unlimited class of service as a war measure.

Unlimited service telephones are held by about 10 per cent of the subscribers and produce about 35 per cent of the calls. This class of service is also known as the "flat rate" service.

The unlimited class of service was one of the concessions given the city five years ago when an ordinance embodying the present rates was enacted.

President Sunny pointed out his request was embodied in a statement to the Council last May, when the committee on gas, oil and electric light started work on a revision of the rates, which is made necessary because of the expiration of the contract entered into five years ago.

He said if the plan is granted the company would be able to make up the deficit which has grown during the last few months by the increased cost of materials, supplies and wages.

Unless the request is allowed, a horizontal increase of 14 per cent in rates will be made necessary to make up the deficit, or an increase of 75 per cent in the cost of the flat rate service would provide ample revenue, he warned the committee.

He argued the elimination of the unlimited service would permit the company to operate its lines efficiently with its present number of telephone operators—6,707.

Chairman T. J. Lynch instructed H. G. Westphaln, city comptroller's office, and G. W. Cummings, department of public service, to make an investigation of Mr. Sunny's claims and submit a report. The assistance of Prof. Edward W. Bemis, the city's gas engineer, will be employed if necessary.

The committee indicated it would recommend the change.

Blomeyer President of Texas Co.

E. C. Blomeyer is president of the Texas Telephone Company, succeeding J. B. Earle, who has retired, but still retains his interest in the company.

Mr. Blomeyer has already assumed the duties of president.

It was understood some time ago that at the annual meeting of the directors of the Texas Telephone Company, to be held in November, that Mr. Earle would retire from the presidency, and that Mr. Blomeyer would succeed him, hence the fact that the change has already taken place comes somewhat in the nature of a surprise.

No man in the southwest is better fitted for the very responsible position that has been given him than Mr. Blomeyer. Not only is he a most capable and experienced telephone man, but he knows how to handle the public. He recognizes the right of the individual, in every instance, and it has always been his policy to give the public the very best possible service, taking the position that the public are entitled to this from a public service corporation.

Mr. Blomeyer is now president of a company with a capital stock of nearly $2,000,000. He has been with the Texas Telephone Company about six years, being secretary-treasurer most of that time.

Earle to Manage Long Distance Lines

Mr. Earle retains his place as a director of the Texas Telephone Company, but will in future devote all of his time to the management of the Texas Long Distance Telephone Company, and he will have an office in the Amicable building, though also retaining his office in the Texas Telephone Company building. Besides looking after the business of the Texas Long Distance Telephone Company, he will also give attention to his other business ventures.

Minnesota Merger Approved

"Postmaster General Burleson approves of the merger of the two telephone companies in Minnesota," announces G. M. Robinson, president of the Tri-State, "and I assume approves of the merger principle since it effects elimination of duplication of service.

"Not only is such elimination of duplication being placed in practice in Minnesota, but in various cities and communities outside the state, wherever mergers appear an improvement.

"I cannot say when the two systems of St. Paul will be so linked up that a person can use a Tri-State instrument when talking to a Northwestern subscriber.

"This will require laying of some cables and equiping switchboards with special apparatus. Much of this work depends upon time, and the mode of financing to be permitted by the government."

Of Interest to the Trade

What the Telephone and Accessory Manufacturers are Doing to Advance the Art

Division of Engineering

Interesting things are happening in the world of technical affairs. The work of the Division of Engineering, United States Employment Service, is becoming so extensive that it is becoming evident that it will soon bring about the disappearance of the paid employment agencies. The Division of Engineering, however, is not concerned about this, for it is the opinion of the director, A. H. Krom, that it is about time that a man has the privilege of working for the government without paying some commercial concern for the right to do so. Despite the short period of its establishment, the Division of Engineering has made many interesting and even surprising discoveries in regard to the engineering profession. It has found many actual cases where men have been compelled to pay fees to commercial agencies before they could get positions in the shipyards and other war activities. It has found also that the engineer and technical man has actually been used by unscrupulous people who have taken advantage of the general confusion in order to enrich themselves.

It is the opinion, however, of the director that by proper educational methods, the individual engineer will learn that he need no longer pay for employment services, because he can get them free of charge from the government itself. Of course, the service that the Division of Engineering can give is necessarily better than that of all others. It has the supreme advantage of being direct. It is based on a comprehensive view that takes in military, commercial and national considerations, and that considers the man and his ability as well as priority and essential needs.

Thus far, the division has received remarkable support from military and governmental authorities, all of whom have recognized in it a medium for efficient patriotic service. The technical societies have also been enthusiastic in their support, though some few, somewhat custombound, have been slow about co-operating. Their attitude, however, will undoubtedly change as they become convinced of the real worth of the division. They must certainly see that eventually a central governmental department of this sort will establish order in the engineering world, and will give the individual man rights and powers of which he has long been deprived.

The record for last month of the Division of Engineering offers amazing testimony of the amount of work it has done in a very short time. During the past month alone, the division has received 468 applications for help from employers; 1,314 applications for help from workers; has referred out 1,063 applications, and actually located 483.

The privileges of the Division of Engineering are open, free of charge, to all engineers and technical men. For service, all they need to do is to apply to the local branch of the United States Employment Service in this city and they will at once obtain the help they need. For additional information and application blanks, they may apply to the central department, Division of Engineering, United States Employment Service, Chicago, Illinois. Whether he is in need of war work or not, every engineer and technical man should apply at once to these offices for registration blanks, so that he may put a record of his ability on file with the government and may thereby at any future date secure a position.

Twenty Stromberg Switchboards for Export.

Foreign Orders

Since the war began foreign buyers of telephone equipment have been placing many orders with American telephone factories and the accompanying photograph is visual evidence that Stromberg-Carlson apparatus is in demand.

This illustration shows twenty new local battery switchboards packed for ocean shipment. This is a single order destined for a ten thousand mile journey overseas. Naturally the transportation to such a distant point involves many more difficulties than a shipment to a buyer in the United States. The packing cases must be heavier and stronger and precautions must be taken to protect the equipment by making the package moisture-proof to avoid the corrosive effects of sea air.

Recently the Stromberg-Carlson Company received a letter from a buyer in South Africa in which it stated that due to thoroughness with which S-C products were packed that the goods arrived after their long journey absolutely unharmed and in better condition than shipments received from points

New Bulletin on Kellogg Universal Switchboard

The cover drawing of the new Kellogg bulletin, shown on this page, is a pictorial illustration of some of the advantages of the Kellog universal switchboard. In the center is a photographic reproduction of one of the many popular Kellogg universal boards. Grouped around this picture switchboard are subscribers using, at the same time, all the different standard types of instruments.

There is a farmer's wife talking over a magneto wall set in the kitchen, and there is a farmer shown talking from the hallway of his home, while through the open door can be seen a silo and a barn, the town grocer using the Kellogg magneto desk stand, the city business man talking over a Kellogg common battery desk set, the society woman using a Kellogg common battery (or magneto) grabaphone, and the foreman in the busy factory

Kellogg Universal Switchboard Bulletin

giving orders over the Kellogg common battery wall set.

The foreword has this to say:

"Local battery telephones for rural line service, party line town telephones, common battery individual or party city line telephones, either wall or desk stand types, all give efficient, economical service with the Kellogg Universal Switchboard."

On page 34, there are thoughts particularly pertinent to the present time. The paragraph on this page summarizing Kellogg universal advantages reads as follows:

"Nearly every large magneto exchange in the country is now operating at rates which are barely remunerative with the existing equipment and which will not permit modernizing the plant. Sooner or later the thoughtful telephone man finds himself square up against this condition: 'He can't raise his rates until he betters his service, and dares not better his service until he raises his rates.' The only complete solution to the above is the Kellogg universal switchboard. It was designed for just such conditions and many prosperous companies owe their very existence to its wonderful possibilities."

The universal switchboard bulletin is completely illustrated and Independent telephone men will undoubtedly find it of interest.

Du Pont Advertising Division Moves

E. I. du Pont de Nemours & Company of Wilmington, Delaware, which is ever to the forefront in displaying initiative and progressiveness, has sprung an innovation in advertising circles by equiping an immense office building solely for the use of its Advertising Division.

Through the expansion of its varied lines and the acquisition by purchase of a number of allied industries the Advertising Division of this great company has increased to such an extent that from a pay roll of eleven people in 1911, it has grown until it now numbers a force of two hundred advertising experts and assistants, under the able direction of George Frank Lord, the company's director of advertising.

In the columns of Kaiser Wilhelm's subsidized press considerable space has been devoted of late to gloating over the alleged abandonment of foreign advertising and curtailment of home advertising by American manufacturers. The du Pont company, however, is one to which the stricture of the kaiser's press does not apply. Instead of reducing its advertising expenditures the du Pont company doubled its appropriation for the present year over that of the previous year and is planning to increase the sum still further for 1919.

The courageous action of the du Pont company in doubling its advertising expense at a time when business conditions bordered on the chaotic served, no doubt, as an inspiration to other great companies which have since been following in the du Pont footsteps and are keeping their names and products constantly before the public eye.

Another important feature of du Pont advertising is the pioneer idea of group advertising of related industries, an idea which is certain to become typical of American advertising in the future.

Contrary to a generally accepted belief, the du Pont company is not engaged solely in the manufacture of industrial and military explosives. In reality it is the greatest diversified industrial enterprise in the world. It manufactures more than a thousand peace products which are widely used in the arts, sciences, industries and the home.

The advertising aims of the company are directed toward furnishing the public with complete information and education as to the uses and proper methods of use of their multiplicity of products. In consequence the importance of the Advertising Division has increased in proportion to the growth and expansion of the company.

The du Pont American industries and the advertising managers of the individual companies are:

The Arlington Works, A. R. Kneale.
Du Pont & Harrison Chemical Works, L. B. Steele.
Du Pont Fabrikoid Co., A. H. Berwald.
Du Pont Dye Works, S. F. Withe.
Harrison & Bridgeport Paint Works, J. Coleman Bentley.
Industrial Explosives, E. F. Carley.
Agricultural Explosives, F. W. Wilson.
Sporting Powders, Edmund Doremus.

The Canadian advertising of the Arlington Company, Ltd., and the Du Pont Fabrikoid Company, Ltd., both of Canada, is in charge of J. M. Cane.

In addition to the above mentioned industries, the company recently acquired a large interest in the General Motors Company. In view of the thoroughness with which the du Pont company applies itself to any proposition, it is safe to predict that its venture into this field will have a marked influence on the future of the automobile business in this country.

International Western Electric Company

The Western Electric ompany's export business with customers, mainly in South America, has been handled by the distributing houses, but largely by local New York. The sales of apparatus to foreign allied and associated companies have been handled through the foreign sales division of the general department, while the company's interest in associated and allied companies and investments abroad have been supervised by the Western Electric Company, Limited, of Canada.

With the thought of co-ordinating all of this work, the International Western Electric Company, Incorporated, has been formed.

The Western Electric Company, Incorporated, will no longer do a foreign business directly, and the new International company will devote itself exclusively to the foreign business.

The export department of the New York house has been combined with the foreign sales division of the general department, which will be the sales and foreign service division of the new organization.

The offices of the International Western Electric Company, Incorporated, are at 195 Broadway, New York.

That part of the new company which will look after the export sales of the old company will combine the personnel of the export department at New York and the foreign sales division of the general department, and its organization is much like that of the distributing houses, W. E. Leigh being assistant foreign manager; J. J. Gilbert being export sales manager; J. R. Tulloch being stores manager, and L. R. Browne being credit manager.

The Buenos Aires house, and other houses that may hereafter be created in South America, or elsewhere, will report to the assistant foreign manager.

The directors of the International Western Electric Company, Incorporated, are H. B. Thayer, H. A. Halligan, Gerard Swope, A. L. Salt and W. P. Sidley.

The officers are: H. B. Thayer president; H. A. Halligan, vice-president; Gerard Swope, vice-president and general manager; R. H. Gregory, comptroller and secretary; J. W. Johnston, treasurer.

Drop Wire Shortage

Managers of Bell telephone offices have received instructions to reject all orders for new telephones or transfers. The order supplements a ruling of August 5 which forbade the taking of all orders for service except for military or physician's use.

The order results from the requisitioning by the government of twisted pair wire, which is required for the stringing of drops. "The commercial department," the order goes on, "will not write the following classes of orders—unless in connection with the direct needs of any branch of the United States government or of any industry directly engaged on work for the government, or in connection with service furnished or to be furnished to physicians:

(a) Orders for new installations including the following: Orders for main stations, either individual, party or rural line service, or branch exchange trunk lines that require line construction or running of drops.

(b) Outside moves that require line construction or running of drops.

Persons who do not have telephones in their homes now, cannot have them installed until the order is rescinded. Persons moving from one house to another cannot have their telephone follow them. The only exception that can be made is when drops are already running from the poles to the house, which makes it unnecessary to do anything save install the instrument.

Automatics for South Africa

In his annual report for 1917, the postmaster general of the Union of South Africa refers to the contemplated installation of automatic telephone systems by the government in various cities of the Union. This action is based principally on the successful use of such a system in Australia and the lower operating costs, which were about 30 per cent below those of the manual system, as reported by a Parliamentary committee of that country in 1915.

Although the installation cost will be higher, the government has decided to install an automatic system in place of the existing manual switchboard at Johannesburg, which is nearing the end of its effective usefulness. This will permit of the establishment of certain unattended branch exchanges, with consequent reduction of the charges for connections to outlying parts of the town. A similar change will also be made at Pietermaritzburg, where a new switchboard is required, and at other places where the present equipment is worn out and new extensions are necessary.

The postmaster general states, however, that he does not anticipate that the new systems will be installed immediately, due to the difficulty of securing the necessary equipment, and probably not until after the close of the war.

Aid to Simplify Telephone Line Supply Needs

It will not be long before the cold winter months will be here again, and a good many companies are probably already laying in supplies for fall construction. Many telephone companies are short handed and find that listing necessary line supplies is, more or less, work. To simplify this work, the Kellogg Switchboard & Supply Company is furnishing a supply of estimate sheets, listing all the more common items, such as poles, pins, brackets, cross arms, wire, insulator, bolts, ground rods, anchors, braces, batteries, etc.

With the aid of the estimate sheet it is stated that anyone can quickly check up his stock, fill in the material needed, forward the estimate sheet to the Kellogg Switchboard & Supply Co. and it will be promptly returned with prices filled in.

A supply of estimate sheets will be gladly sent by the Kellogg Switchboard & Supply Company at Chicago, upon request.

"Telephones Like Saucepans"

"Last week we had two Y. M. C. A. entertainments for the boys—'a movie' outdoors in the village square and an indoor concert. The movie is the first ever seen in this town and brought out all the inhabitants. The children were most outspoken in their delight. One Frenchman was struck by the frequent use of the telephone (it was an American film) and exclaimed in French, 'Mon Dieu, they have telephones like saucepans.' When you understand that no house in France has less than a dozen saucepans you get his viewpoint."—From a letter of Major H. H. Shearer, 407th Telegraph Batallion, to *Telephone Review*.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES.

The first service star to be placed on the service flag of the Mountain States Telephone and Telegraph Company, at Gunnison, Colo., for a woman employe was added when Lenora Anita Chance, chief service observer, left for New York City. Miss Chance has been selected for work as a long distance operator in France, and expects to sail after a short course in training.

John Marshall Clark, formerly president of the Chicago Telephone Company, was buried recently in Marion, Mass. He was a pioneer resident of Chicago. Mr. Clark was a government surveyor.

Marion Kennedy has resigned as chief operator of the Trowbridge Telephone Company (Illinois). Kennedy, although blind, has filled the position for 14 years with an efficiency and courteousness that are remarkable. His resignation will be received with regret by all who have business with Trowbridge exchange.

James T. Daniels, traffic manager of the Central Union Telephone Company, at Columbus, Ohio, succeeds George W. Gilette, secretary of the Chamber of Commerce, who has accepted a responsible executive position with the F. & R. Lazarus & Co.

T. H. Dabney, local manager for the Murphysboro Telephone Company, at Centerville, Ill., has resigned his position with the telephone company to take a position as electrician with the Federal Coal Company.

Grant McLaughlin, former test man for the Michigan State Telephone Company, at Bay City, Mich., has left for Newport, R. I., having enlisted in the navy.

D. Stowell, Royal Oak manager of the Michigan State Telephone Company, has been transferred to Pontiac, and will be succeeded by A. M. Thayer, of Birmingham.

Manager O. G. Freeman, of the Hillsboro Telephone Company, at Hillsboro, Texas, tendered his resignation to the company, effective as soon as his successor could be supplied. Mr. Freeman installed the Hillsboro exchange in 1906 and then was away for about 18 months in telephone work at Amarillo, when he returned to Hillsboro and has been in charge of the office since 1911.

Bernard J. Leonard, for several years auditor for the Home Telephone Company, in Pasadena, Cal., has been transferred to San Francisco, which will be his headquarters in the auditing department of the Pacific Telephone Company. For several months he will be engaged in the capacity of traveling auditor, arranging auditing systems for telephone companies along the coast. The auditing system of the Home Telephone Company was recently transferred to Los Angeles, enabling Mr. Leonard to accept the more important position in San Francisco. Mr. Leonard will be greatly missed in Pasadena, where he has made a host of friends and has been active in civic and fraternal affairs.

William E. Entrekin, for several years employed as a city telephone lineman by the Home Telephone Company, at Columbus City, Ind., and custodian of the Commercial Club, has accepted the position as manager of the telephone exchange at Acton, Indiana, for the Consolidated Telephone Company, of central Indiana.

John C. Hardy, manager of the Northwestern Telephone Company, at Minneapolis, Minn., for a number of years, has been appointed commercial manager of the consolidated Northwestern and Tri-State Telegraph and Telephone Companies.

W. S. Williams, St. Paul manager for the Tri-State Telephone and Telegraph Company, and connected with the commercial organization of the telephone companies in the Twin Cities for the last 19 years, has announced his resignation.

E. B. Van Horn, who has been employed as plant chief for the Pioneer Telephone Company, at Woodward, Okla., has been transferred to Enid, where he will be plant chief of the Pioneer company. I. F. Purkey, who was formerly plant chief, will again take up the work in the Woodward office.

Frank M. Fisher, of Wilkes Barre, Pa., has been appointed to fill the vacancy of the Bell Telephone Company, caused by the induction into the military service of Manager John H. Hall. Mr. Fisher has been manager of the Wilkes-Barre office of the company for some time past.

Claire S. Law, general manager of the Interstate Telephone Company, at Sterling, Ill., who signed up some little time ago for Y. M. C. A. overseas duty, received a telegram from the Y. M. C. A. war personnel board, requesting him to come to New York at once, that his passports will be ready and issued in a few days.

D. H. McNish, who has been manager of the Kentucky Home Telephone Company, at Mt. Sterling, Ky., for several months, has been promoted to the position as District traffic chief, with headquarters at Paducah.

J. C. Ainsworth, one of the directors of the Pacific Telephone and Telegraph Company, residing in Portland, Ore., has been offered the position of government director of the wool industry in the Northwest.

J. Sutton Jones, local manager of the Cumberland Telephone & Telegraph Company, at Cleveland, Tenn., has left for Chattanooga, where he has accepted the position of cashier of the Chatanooga office. Mr. Jones' successor will be David Drinnon, who now occupies the position of assistant cashier in the Chattanooga office.

B. F. Gay and A. G. Little are erecting a private telephone line from their country homes to Blytheville, Ark., which will soon be installed and ready for service. The party line which serves that section is very unsatisfactory, and they propose to have something they can depend upon. The party line now in service is a private line, but has so many telephones on it service is unsatisfactory.

Manager B. M. Dunn, of the Rochester Telephone Company, at Rochester, Minn., was one of the first to come forward in connection with the appeal for men for work on the farms. When he saw the papers and learned that farmers in the country are in urgent need of immediate help, he bethought him that it is possible for him to dispense with the services of his men for two or three days and let them go to the fields to do a good service for the entire community. He told the local papers that he has sixteen men on the country extension service that he can release to farmers.

P. M. Ferguson, manager of the Mankato Citizens' Telephone Company, at Mankato, Minn., has been appointed instructor to the men in the selective service, signal corps, at the state university, Minneapolis. Mr. Ferguson will make regular trips to the university to meet his classes, and expects to return to Mankato at the end of each week. During his absences Frank Gauthier will be in charge of the business at the Citizens' Telephone office.

C. Percy Short has resigned his position as manager of the Owensboro Home Telephone and Telegraph Company, at Owensboro, Ky., to take effect as soon as his successor can be appointed.

C. A. Barth, who for the past six months or so has been local manager of the Northwestern Telephone Company, at Sioux Falls, S. Dak., has been transferred to Litchfield, Minn., and M. E. Guinter, recently transferred from the local to the district manager, will from now on fill the positions of both district and local manager.

Bayard Kilmore, of Cincinnati, has been recommended for appointment as regional director of telephones in the region of which Ohio will be a part.

NEWS FROM THE FIELD

CALIFORNIA

The railroad commission has authorized the San Diego Home Telephone Company, T. A. Thompson and Title Insurance and Trust Company to sell the telephone utility properties they own and operate in San Diego, to the Pacific Telephone and Telegraph Company, for not more than $650,000. The commission will later determine the exact purchase price to be paid, the $650,000 having been agreed upon by the Pacific and San Diego companies.

The Pacific Telephone Company recently completed stringing new wire between Delta and Castella and also between Sisson and Yreka. The wire strung was 17½ miles to Castella and 27 miles from Sisson to Yreka. This improvement cost the company $12,800. A crew of eleven men has been on the job for the past two months.

Consolidation of the Home and Pacific telephone systems in San Diego has been temporarily abandoned, and the application of the Pacific for a rate raise is being held up at the request of that corporation. This action is on account of the taking over of telephone and telegraph systems by the government. The state railway commission has ordered a

"temporary removal from the calendar" of the adjourned hearings on the case, set for late this fall.

The Taos Telephone Company, at Santa Fe, has given notice to the state corporation commission that the telephone service from Taos Junction to Ojo Coliente would be discontinued, as the company is giving service $30 a month for $3 to a lumber company.

C. F. Mason, manager of the industrial activities of the Southern California Telephone Company, at Los Angeles, states that he was expecting orders from Washington at any time barring the use of German over the telephone.

CANADA

The Bell Telephone Company of Canada showed net earnings of $2,534,072 in the year ended December 31, 1917, according to the company's annual report just made public. This compares with $2,469,242 earned in the preceding year and $2,221,985 in 1915. The balance before dividends in the 1917 year aggregated $1,973,072, and after the dividends, which were $1,440,000 surplus stood at $533,072.

CONNECTICUT

A force of men from the Southern New England Telephone Company, at Waterbury, is taking out the old poles on South and Main Streets and replacing them with higher and stronger ones preparatory to installing a new cable toll line. This, according to those in authority, will make for better service as it will eliminate many of the overhead wires which are subject to foreign interference.

ILLINOIS

The reorganization committee of the Western Illinois Telephone Company, of Macomb, and the Mann Telephone Company, of Macomb, W. E. Mann, president, filed a joint petition with the Illinois public utilities commission, asking for an order approving the sale by the Western Illinois Telephone Company to the Mann Telephone Company, of its properties in Adams, Hancock and McDonough counties. The Mann Telephone Company also asks for a certificate of convenience and necessity to operate telephone lines at Camp Point, Bushnell, Lima, Loraine, Uursa and Tioga and toll lines from Macomb to Prairie City from Loraine to Quincy and from Loraine to Sutter and authority to issue $44,000 of capital stock.

W. M. Keck, of the Keck Telephone Company, at Princeville, has offered to assist farmers in getting needed help, upon request of the Department of Labor. Those wishing help may call up Mr. Keck and he will put the application in at once and the appeal goes to headquarters where the demand is supplied to as great an extent as possible.

Application for increases in telephone rates at Litchfield and Mt. Auburn have been filed by the telephone companies of those two cities with the state public utilities commission. The Litchfield company wants to charge $2.75 a month for business telephones; $2.25 for two-party business telephones; $1.75 for residence telephones; $1.25 for two-party residence telephones; $1.25 for farmer telephones, and 50 cents for extensions. The Mt. Auburn company wants to charge $21 a year for business telephones; $18 for residence telephones, and $15 for party lines.

James I. McDonald, of the Chicago Telephone Company, has bought from the trustees of the estate of Elise Frank the property in 44th, 138 feet east of Cottage Grove, 155x220 feet, stated price $20,000. This property adjoins a present exchange building of the company and will be used for future extensions.

War activities of Chicago added a new section to the July issue of the classified telephone directory. Pages 4, 5 and 6 of the book are devoted to the names and telephone numbers of various branches of war work and war relief work, with a brief explanation of the character of each of the individual branches.

At a recent meeting of the board of directors of the Farmers' New Era Telephone Company, held at Hebron, a 3 per cent dividend was declared. The total number of telephones in use on July 1 was 1,100, of which number 494 were in Hebron, 355 in Richmond, 194 in Wilmot, Wis., and 27 in Spring Grove.

A new telephone switchboard has been installed in the statehouse at Springfield. It does away with all individual departmental calls. The board is the central exchange for all departments. All a person wishing to call a state employe on the telephone has to do now is to call for Main 1400 and ask for the party. The board will be kept open day and night.

The Smiley Bros. telephone exchange at Springfield has filed an application with the state public utilities commission to make effective the following rates in O'Fallon and Lebanon; business direct line, $33; residence direct line, $27; residence two-party line, $24; residence four-party line, $21. A rebate of 25 cents is to be allowed for prompt payment.

The United Telephone Company's exchange, at Ottawa, has been a busy place lately. Since the Allies have been making things hum on the big drive in France, people in the farming districts have kept the telephone girls so busy that several extra operators had to be added to the force workings.

The Lexington Home Telephone Company has filed with the State Public Utilities Commission of Illinois an application for permission to increase the rates for business, residence and rural service in Lexington and vicinity, County of McLean.

The Murphysboro Telephone Company has a force of workmen busy installing three new circuits connecting Eldorado and Harrisburg. They are also making other valuable and permanent improvements to their extensive system throughout Southern Illinois. O. W. Fullerton, local manager, is always on the job and has added a large number of patrons to the Eldorado district.

The Farmers' Union Telephone Company has filed an application with the state public utilities commission for approval of the sale of its equipment in the village of Kirkland to the DeKalb County Telephone Company. Other equipment is included.

Federal Official Crane of Washington has been conducting an investigation of the Bell Telephone and the Interstate Telephone systems in Springfield and hearing reports from the local managers in regard to the consolidation of the two companies under government control. Crane will make a report of his investigations to Washington officials and it is thought that some action will be taken within the next few days. The real effect of the government's action has not been determined, but officials of the two lines believe that only one system will be maintained in the city after control has been assumed at Washington.

Re-election of all directors except one, who is no longer financially interested in the company, was accomplished at the annual meeting of the Queen City and Shelby County Mutual Telehone Company, at Shelbyville, and all officers were re-elected by the directors. S. B. Carr is the new director, taking the place of B. F. Stretch. The other directors are J. W. Killam, L. R. Pauschert, C. M. Fleming, E. M. Hopkins, A. L. Ward, W. A. Storm, F. O. Bisdee and I. S. Storm. The officers are: President, J. W. Killam; vice president, L. R. Pauschert; secretary and manager, C. M. Fleming; treasurer, O. W. Walker; collector, E. M. Hopkins. Wesley Storm remains as chief lineman, and the company is now engaged in putting the main lines in the city in cables. Considerable difficulty is being experienced because of the lack of labor and the trouble in getting shipments of material.

The Macoupin County Telephone Company, at Carlinville, has recently purchased the Auburn telephone exchange, and is planning to add to its equipment and place the same in a better condition to furnish their patrons the best of service. This company, besides owning the exchange in this city, owns the exchanges at Girard, Virden, Gillespie and Benld, and has quite a well equipped exchange at each point.

INDIANA

The Pike County Telephone Company, operating exchanges at Winslow, Petersburg, Otwell, Monroe City and Washington, has made application to the public service commission for authority to increase the rates for telephone service at the Petersburg exchange. The new rates asked for in the petition are as follows: Independent line business, $3.50; two-party line business, $2.75; residence, $2; four-party residence, $1.50; rural line business, coal mine offices and other business places on party line, $2.75; rural party line residence, $1.75. The old rate for the business line is $2; residence, $1.45; party line, $1. The business rate would be increased $1.50 on each line and the residence lines increased 55 cents.

Receivers for the Central Union Telephone Company have filed a petition with the public service commission for authority to increase rates at South Bend and Mishawaka for both the Central Union property and the South Bend Home Telephone Company. The proposed new rates are as follows: Business, $5.50 a month; residence, $2.75 a month, and rural, $1.50 a month.

Subscribers of the Lynn Telephone Company, at Winchester, have formed an organization to fight the contemplated raise in rates. The company has asked permission of the public service commission to raise the price from $1.00 to $1.25 per month. Farmers are indignant over the proposed raise and have formed an organization of four hundred members, who have signed an agreement that if the price is raised they will take the telephones out of their homes and anyone in the organization

who fails to do so, is subject to pay into the treasury of the compact the sum of $25.

E. A. Tull, manager of the local telephone company, at Lapel, is placing the wires underground.

The telephone company at Brownstown prohibited conversation in German over its lines. Many protests have been filed in German communities, but the company officials have directed operators to follow the rule.

The telephone companies of Lynn, Farmland, Ridgeville and Redkey have petitioned the public service commission to merge with the Eastern Indiana Telephone Company. The capital stock of the four companies is $40,000.

The Farmers' Mutual Telephone Company of Columbia City has filed a petition with the state utilities commission to increase the capital stock of the company from $100,000 to $125,000. The new stock is to be issued in shares of $25 each. The petition gives the present value of the company as $121,794, and it would cost to reproduce it $146,187, according to the appraisement of J. K. Johnson, telephone engineer.

In the case of the City of Winchester vs. The Farmers' Telephone Company, the court granted a restraining order against the defendants.

Bell Telephone Company and Independent Company at St. Clairsville have been merged.

The Otterbein Telephone Company, at Indianapolis, has purchased the Montmorenci line and will take charge of the business the first of September.

The new telephone system which is now being installed in Attica is almost completed, and indications are that it will be finished in four weeks. The change has invovled an immense amount of work and a large expenditure of money, telephone officials stated, but when it is completed, Attica will have one of the most modern and up-to-date telephone exchanges in the state.

IOWA

The Inter-State Telephone Company, which owns exchanges at Modale, Mondamin, Little Sioux and Pisgah, has been sold to Frank M. Johnson of Missouri Valley and J. A. Bobst of Council Bluffs. Mr. Johnson has had over thirteen years of service with the Bell system, acting as manager for the Iowa Telephone Company at Missouri Valley, and later in the same capacity at Clarinda. Mr. Johnson is now traveling salesman for the Consumers' Refining Company. Mr. Bobst has had over thirteen years' service with the Iowa Telephone Company, and has for the past five years made Council Bluffs his headquarters as district traffic chief for the district which covers the southwestern part of the state. Mondamin will be made the headquarters for this company, which will be known as the Liberty Telephone Company. Several improvements are planned by the new owners and they will endeavor to maintain the most efficient service at all times over the "Liberty" lines.

KANSAS

A voluminous petition, asking for increased rates, has been filed with the Kansas public utilities commission by the Southwestern Bell Telephone Company, at Topeka. The increase is asked because of the heavier expense of installation and relocation of telephones, according to the petition. The company asks for permission to charge a flat rate of $1 for moving a telephone from one location to another in the same room, $1.50 for moving it from one room to another, in cities of 5,000 installations or more, and in larger cities, $2. The rate asked for removal from one building to another varies from $2.50 to $3.50, for mainlines, and $1 for each extension. The company also wants to charge $1 for each restoration after a suspension, and a similar charge is asked for changes from wall telephones to desk telephones, and the reverse.

The City Telephone Company, at Lenapah, owned by Mrs. Leone Elrod and her husband, Charles, has been sold to Harry Bell, of Coffeyville, who will take personal charge. Mr. Bell had had years of experience in the telephone business and will make the local company flourish under his management. Mrs. Elrod has left to join her husband in San Antonio, Texas, where he is located in the army.

An application has been filed by the Southwestern Bell Telephone Company, at Wichita, with the Kansas public utilities commission, asking permission to increase rates for the Wichita telephone exchange. The new rates asked for are: Business telephone, $6 a month; individual line residence, $3, and party line residence telephone, $2.50 a month. This is a 50 per cent increase over the old rate for residence telephones. The present rates charged by the company are: Business, $5; individual residence telephone, $2, and party line, $1.50 a month.

MASSACHUSETTS

The government now has a pair of wires in the submarine telephone cable and the wireless station at Siasconset, Mass., and is in direct communication thereby by telegraph with Newport. Modern inventions are wonderful indeed. Here is a submarine telephone cable serving for both telephone and telegraph service at the same time.

The local telephone office has been putting out the summer issue of the telephone directory for the North Shore district, which includes Gloucester, Magnolia, Rockport, Essex, Manchester, Beverly Farms, Beverly, Salem, Lynn, Danvers, Hamilton, Ipswich, Lynnfield Centre, Marblehead, Nahant, Peabody, Saugus and Topsfield.

MICHIGAN

An agreement has been reached between the city of Detroit, Mich., and the Michigan State Telephone Company, under which the city authorities have agreed, in so far as is in their power, to give the company $1,330,000 additional revenue for the coming year. The proposals are to be submitted to the common council on a later date.

When he forwards the new schedule of rates asked of the city by the Michigan State Telephone Company, Mayor Marx will inclose a letter asking the council to make a survey of the recent appraisal of the Detroit Trust Company before passing judgment on the fairness of the increases asked. The letter also says that, as the Government has assumed control of the company, and he has asked the Government whether the city will deal with the company's demands, action should not be taken until a reply has been made.

Because of a scarcity of certain kinds of materials, especially covered wire, the entire supply of some sorts of which has been commandeered by the Government, the Michigan State Telephone Company has been obliged to refuse to take any contracts for new telephones, excepting where the service is for plants doing Government work, or for physicians. The order on the subject goes even further than that, for it forbids the moving of telephones already in service, if such moving will require the use of any additional material. Manager Bailey, of the Valley Home Telephone Company, says that no similar orders have been given to his company, and that they are continuing to do business and to take new orders as usual.

MINNESOTA

The city of Minneapolis was notified today by the Tri-State Telephone Company that the Tri-State lines had been sold to the Northwestern Telephone Company, and that the latter company was now in control. The notification was sent to obtain payment by the the city of the Tri-State telephone bill, amounting to about $1,000 for the months of July and August. Dan C. Brown, city comptroller, refused to pay the bills when presented on Northwestern Telephone Company blanks, on the grounds that he had not been notified of the merger. Mr. Brown said he would continue to hold up payment, as he was not yet sure of the status of the company. C. D. Gould, city attorney, declared that it was probable the federal control of telegraph and telephone systems would tie up the merger to some extent, and said that he was planning an immediate investigation.

Extension of the commercial district of the Duluth Telephone Company has been affected to include more towns south of Duluth, according to F. E. Lister, district general manager of the Duluth Telephone Company. Barnum, Hinckley, Moose Lake and Sandstone are now included in the local company's exchanges. The Mesaba range and Vermillion district also have extensions. This makes a total of 24 exchanges operated by the Duluth company.

St. Paul will make a concerted effort to induce the Railroad and Warehouse Commission to establish a free telephone zone extending into Minneapolis as far as Oak street. The public utilities committee of the St. Paul Association has been authorized to take the matter up with the commission. It is contended by St. Paul citizens that this city is being discriminated against in the matter of a free telephone zone into Minneapolis.

The Ivanhoe Telephone Company held a meeting recently, at which time it was decided to transfer this company into a mutual company, where each patron is to become a shareholder. Details will be announced later.

All the long distance telephone lines in Crow Wing county operated by the Tri-State Telephone and Telegraph Company, have been inspected, and a complete detailed inventory obtained by a crew of telephone men under the direction of the Minnesota railroad and warehouse commission. These reports form the basis for making an appraisal of the physical value of the long distance lines in Minnesota, with a view to determining

the reasonableness of telephone toll rates in the state.

Extensive improvements to the lines of the Rochester Telephone Company are being made under the able supervision of F. A. Roepke, plant manager. The rural lines are being put into better shape by a thorough rebuilding plan. An expenditure of $25,000 is expected to result from the plans being carried out at the present time. From $10,000 to $15,000 will be spent on alterations and improvements to lines within the city.

Commissioner Fred W. Putnam, of the Minnesota Railroad and Warehouse Commission, in Redwood Falls, August 26, conducted a hearing upon the application of the Redwood Falls Electric Telephone Company for permission to increase some of its telephone rates in that city. The company is desirous of increasing the private line residence rate 25 cents a month. The private lines business rates will be billed at $2.25 per month and the two-party business rates at $2.00 a month, but both will be subject to a discount of 25 cents a month if payment is made by the 15th of the month in which service is rendered. The residence rates proposed are respectively: Single party, $1.50 a month; two-party, $1.25; three-party, $1.00, all subject to the 25 cents discount. Rural switching, 25 cents per month, net.

NEBRASKA

The Pierce Telephone Company has been sold by Hunter and Cheney to M. R. Dutcher, of Plainview, who owned it until six months ago, when he sold it and purchased the one at Plainview, which he sold to C. W. Smith. The money consideration was $25,000.

NORTH CAROLINA

The North Carolina Corporation Commission recently dismissed the petition of the Southern Bell Telephone and Telegraph Company, asking for permission to increase rates in a number of cities in this state. In dismissing the petition the Commission stated that, since hearing the matter recently, the government had taken over the operation of all telephone lines in the country, including lines of the petitioner, and should it become necessary under government control to increase the rate, Federal authorities can do so. The cities in which the telephone company asked to increase rates were: Charlotte, Davidson, Greensboro, Winston-Salem, Hamlet, Mt. Olive, Raleigh, Reidsville, Salisbury, Wilmington, Wrightsville Beach, Asheville and Hendersonville.

NORTH DAKOTA

The Grand Forks city council has passed a resolution authorizing the purchase by the Northwestern Telephone Company of the exchange of the Tri-State Telephone Company, and the merging of the same. W. S. Whitman, chairman of the Grand Forks committee that has been in charge of negotiations for the centralization of the telephone business in one company, said that it may require at least 18 months to perfect the physical merger of the companies.

A new telephone line has been established by a number of farmers southeast of Adams. The line will be called the Southeast Adams Telephone Company, and the subscribers so far are Harry Fletcher, Wm. Johnson, Amon Nelson and Lars Erickson. The line will be about six miles long and the service will be extended to farms hitherto without telephone connection.

OHIO

The Bell Telephone Company and Independent Telephone Company at St. Clairsville, have been merged.

The Ohio State Telephone Company, at Columbus, has applied to the state public utilities commission for authority to purchase the Citizens Telephone Company, of Berea; the Portage County Telephone Company, of Ravenna, and the Nelsonville & Murray Home Telephone Company, of Murray City.

At a recent meeting of the telephone company, at Eaton, the wages of the telephone employes were raised. The girls had asked for money, preferably about $10 per month increase; this the company did not grant, but did make an increase all along the line of about 50 per cent of the demand.

Wooster telephone girls are to have a handsome new kitchenette, in the new telephone building that is nearing completion. There they can have warm coffee or anything else that appeals to them, on rainy days, when the night shift is working, or any other time. The new telephone building is a model of its kind. The building is now nearing completion.

Federal control of telephones will have no immediate bearing on the Ohio State and the Central Union rate increase cases pending before the public utilities commission in Columbus. No decision has been made by the commission in either case. An appraisal of the Ohio State Telephone Company, as ordered by the commission, is nearing completion.

To give its patrons an opportunity to understand just what is being done for them, the Williams County Telephone Company, at Montpelier, has installed a demonstrating equipment in the Women's rest room, and wants every person interested to call and investigate. The new system will be shipped about the 9th of October and likely will be ready for use by the first of November. The local offices of the company are being remodelled so as to give the operators more convenient and comfortable quarters and also to permit better service.

The Portsmouth Telephone Company is making progress on the new exchange that is to be opened at New Boston in the Coburn building. The cables are now being laid underground. The switchboard has not arrived from Chicago, and is holding up the work of installation. In position, the board will take care of between 500 and 600 telephones.

OKLAHOMA.

The Southwestern Bell Telephone Company, at Oklahoma City, filed a petition with the state corporation commission for the right to inaugurate a new system of charges, which will guarantee the company additional revenue. The petition asks the right for the company to make charges when patrons request their telephones removed from one room to another, or from one building to another. This charge is to be fixed by the commission. The patron who failed to pay his bill and had his telephone cut off, would be compelled to pay the company the cost of reconnecting the lines. The company further asks the right to charge $3 for installing each telephone and, in return, the company would compel patrons to pay only one month in advance, instead of three months, as is now demanded. This new system of charges would be inaugurated wherever the company has properties in the state, according to the petition.

OREGON.

Mrs. F. M. Chrisman, of Silver Lake, has taken the position of telephone operator at that place. Because of the condition of the line between Silver Lake and Paisley, all communication between those two towns has been abandoned, which leaves Lakeview practically isolated from the northern part of the county, so far as telephone service is concerned, except for the Forest Service line.

The Pacific Telephone & Telegraph Company, at Newport, has a force engaged in carrying out extensive improvements on its system.

PENNSYLVANIA.

Toll rates on the lines of the Consolidated Telephone Company, between Allentown and Kutztown, Lehighton, Mauch Chunk, Reading and Slatington, will be raised on September 1st, according to notices being given subscribers. The increases vary from 25 per cent to 100 per cent, and are as follows: Allentown to Kutztown, new rate, 15 cents; old rate, 10 cents, increase, 5 cents; Lehighton, new rate, 20 cents; old rate, 15 cents, increase, 5 cents; Mauch Chunk, new rate, 20 cents; old rate, 15 cents, increase, 5 cents; Reading, new rate, 25 cents; old rate, 20 cents, increase, 5 cents; Slatington, new rate, 10 cents; old rate, 5 cents, increase, 5 cents. The new schedule of toll rates is dated July 31, but does not become effective until September 1. All costs involved in the operation of telephone exchanges and toll lines have increased very materially during the past four years, is the reason assigned by the company for the increase.

E. L. Daron, manager of the Scranton district of the Consolidated (new) Telephone Company, has made the announcement that the company has filed with the public service commission, in Harrisburg, a new schedule on toll rates on calls from this city to certain towns in this part of the county and state. Mr. Daron declared that the toll will be increased on only three or four calls to towns in Lackawanna county. Calls to Carbondale will now cost 10 cents, while for some time past 5 cents was the rate. "No change is contemplated in the monthly telephone rate," said Mr. Daron.

A petition of Philadelphia business men, praying that the Bell Telephone Company be required to attach to telephones a register or meter for the recording of all outgoing calls, is now before the public service commission of the state. The petition, which was filed by the United Business Men's Association, recites the fact that in the last five years thousands of complaints have been made to it by its members about the excessive number of outgoing calls charged against telephone subscribers. It also points out that subscribers are without means of redress, save in so far as the Bell Company is willing to concede the justice of any complaints. Complaint is also made that, by reason of the lack of recording meters or registers, thousands

of dollars are being lost annually to the people of Philadelphia, and that to this extent the facilities furnished by the Bell Company are not adequate and sufficient for the accommodation of the public. That the additional service can be supplied free to each subscriber without great cost or injustice to the company is also averred in the petition.

TEXAS.

There have been several changes in the working force of the Southwestern Telegraph and Telephone Company at Lubbock. F. L. Childers, who has been manager here for some time, has been transferred to Fort Worth, and will take district work. He is succeeded here by C. L. Stewart, who is now on the job as manager of the Lubbock plant. Mr. Stewart comes from Henrietta, and is well pleased with Lubbock and the plant at this place. A. E. Rennells, who has been wire chief here, will work out of Fort Worth as division equipment installer. His family will remain here for the present. J. B. Cole, Jr., who has been with the company here, has taken management of the plant at Lockney.

The people of Plainview refuse to stand for the raise in rates, as demanded by the Southwestern Telephone Company, which proposes to increase the residence rate from $2 to $2.25 per month, and the business rate from $3 to $3.50 per month.

Active work and the acceptance of the telephone merger franchise by the Dallas Automatic Telephone Company and the Southwestern Telephone Company are expected within a very short time. A meeting of the officials of the two companies is expected soon, and Mayor Lawther said that he had been informed that as soon as this meeting is held the franchise would be accepted and the work of combining the two companies and having universal telephone service would start. John O. Casler, president of the Automatic Telephone Company, said that the meeting of the officials either would be held in St. Louis or New York in the near future.

Mrs. O. G. Freeman has been appointed manager of the local exchange of the Hillsboro Telephone Company, to succeed her husband, who resigned to take charge of his growing business, the Freeman Battery Company. The appointment of Mrs. Freeman will be very pleasing to the Hillsboro people. She has been with the company many years, serving as chief operator for several years, and later assisting Mr. Freeman with his work as manager, and is therefore thoroughly familiar with the duties of her new position. She is a most excellent lady, courteous and obliging and the business will be kept up to its usual efficiency under her able handling.

Yet another "win the war" noise has been introduced by the Southwestern Telegraph and Telephone Company at Dallas, Texas. Telephone girls have been instructed not to answer "will ring them again" when an impatient patron jiggles the receiver of the telephone instrument in quest of quicker service. Instead of the telephone girl's reply the telephone will emit a humming sound which is meant to indicate that "all's well along the Potomac," and that central is still alive and on the job. To expedite winning the war the Bell company has instructed the telephone girls not to tell people the time of day, the location of fires, etc.

The city of Dallas has no jurisdiction over the Southwestern Telegraph and Telephone Company at the present time, and it is not probable any action can be taken in connection with recent complaints that excessive charges are being made for removal of telephones, the mayor said. He has placed the matter in the hands of A. S. Hardwicke, city attorney, for investigation, and if it is possible to do anything, necessary action will be taken to remedy conditions.

On account of the 25c minimum by the telephone company at Wharton, complaints are being registered. A committee of citizens appeared before the city council advocating city or government control of the system. The council has the matter under advisement. An order was issued instructing the mayor to at once take the matter up with the postmaster general, and it is presumed that the reply will settle the controversy. Many patrons have refused to pay the increase, though it has been agreed by L. P. Wells of Houston, the company's representative, that if the company is not sustained in its contention, all excess payments will be promptly refunded.

UTAH.

The Uintah Telephone Company at Park City has filed application for certificate of convenience and necessity to construct a toll telephone line between Stewart's ranch to Park City. At Park City it is planned to connect with the lines of the Mountain States Telephone Company.

VIRGINIA.

At the annual meeting of the board of directors of the Northern Neck Telephone Company, held at Warsaw, the following officers were elected: President, R. Carter Welford; vice-president, George N. Reed; secretary-treasurer and general manager, Rodney Goggin, Warsaw.

WASHINGTON.

The Pacific Telephone and Telegraph Company has appropriated $23,620 to cover the cost of placing one No. 12 copper circuit and phantom circuit between Spokane city limits and Valley, Wash., a distance of approximately 48 miles, a No. 12 copper circuit between Valley and Chewelah, a distance of 8 miles, and the reconstruction of the entire lead between Spokane and Chewelah.

A new and complete telephone system is now in operation in Rainier National Park. This is the outcome of the governmental control of telephone and telegraph lines. A new trunk has been constructed that connects the park with all the park camps and hotels within the reserve and with Tacoma and Camp Lewis.

President W. N. Winter effected an adjustment of differences between the Puget Sound Telephone Company at Everett and its men and women employes by which a threatened walk-out was averted. It is understood that while not wishing to make trouble for the management, nevertheless the employes sought to place their wants of increased wages on record before the federal government assumed control of the Puget Sound Telephone Company.

WEST VIRGINIA.

Announcement has been made by W. T. Williamson, of Charleston, general manager of the Chesapeake & Potomac lines, a subsidiary of the Bell system operating in West Virginia, that the Chesapeake & Potomac system will take over the lines and holdings of the West Virginia Consolidated Telephone Company in Wheeling and that vicinity. Mr. Williamson was enroute to Wheeling from Charleston to look after details connected with the merger. No announcement was made relative to the momentary consideration the Consolidated would receive. The merger is the result of efforts which have been made by the Chesapeake & Potomac to acquire the holdings of the Consolidated for some time. Their efforts were opposed, it is said, by Wheeling business men who favored the Consolidated company.

All the old National telephone instruments are being removed from business places and homes throughout the Wheeling district, following the Bell corporation taking over the Independent lines. Practically all the instruments have been taken out in this immediate vicinity and men are now working in the outlying section. New Bell telephones are being installed as rapidly as possible in the place of the Nationals and for many new subscribers who never had telephones before. The inability to secure competent linemen, on account of the war, has retarded the work in installing telephones. It is said that within a short time all subscribers will have their instruments in place.

The Wheeling Board of Education will contract for a telephone to be used in the office of the high school, but, according to a recent statement of Clerk Frank Stanton, of the board, no contract for telephones will be made for grade schools until a protest lodged with the public service commission, against the "exorbitant" contract price demanded by the Chesapeake and Potomac Telephone Company, is heard from. The telephone company classes school telephones as business telephones and demands a rental of $6 the month, or $72 the year for the service. The board of education committee considers this rate exorbitant for the reason that school telephones are used but five days the week and ten months the year; and that daily, they require several hours less service than the ordinary residence telephone.

WYOMING.

Agents of the Mountain States Telephone Company at Riverton have secured signatures of practically all users of telephones in this district to a petition asking authority to increase rates of service.

A new line of telephone from Douglas to Lusk has been completed by the Mountain States Telephone Company, giving excellent toll connections with all outside points.

The copper telephone circuit between New Castle and Custer, S. D., has been completed and connections made with the local exchange. This opens up a big new territory in this part of the state for telephone communication.